



103 YEARS OF UNCOMPROMISING POLICY RESEARCH

MICHIGAN'S LEAKY TEACHER PIPELINE

EXAMINING TRENDS IN TEACHER DEMAND AND SUPPLY

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MICHIGAN'S LEAKY TEACHER PIPELINE: EXAMINING TRENDS IN TEACHER DEMAND AND SUPPLY

In A Nutshell

1. With fewer K-12 students, some decline in Michigan's teacher ranks is normal and inevitable. But it's not that simple. Need is evident in urban regions and growing in some areas – English as a Second Language, special education, science, technology, engineering and math (STEM).
2. Enrollment in teacher-prep programs in Michigan colleges and universities has been falling for some time, by 66 percent over a recent seven-year period. This is compounded because the number of program completers and the number of individuals who obtain state certification in specific subject areas is down as well.
3. Understanding and addressing the real and potential shortages is hampered by the lack of clear data about the teaching workforce. Michigan has not prioritized studying this labor market and the shortage issue, so analysis is somewhat stymied by a shortage of available, timely and relevant information.

Summary

As public K-12 teachers and students across Michigan returned to school in the fall of 2018, they were greeted by a barrage of headlines warning of current or impending teacher shortages:

"Michigan school districts battle widespread teacher shortages"

"Across Michigan, school districts large and small struggle to put teachers in classrooms"

"Southwest Michigan schools face the teacher shortage"

The shortage drumbeat seems fairly consistent. While some school districts have endured longstanding challenges staffing classrooms, many others only recently began reporting regular and predictable difficulty finding qualified teachers to fit their schools' needs. A growing number of districts indicate that their staffing problems extend beyond the fall and last well into the school year. These reports are accompanied by claims of expanding class sizes, increased use of permanent, or at least long-term substitutes, and greater numbers of teachers working outside their endorsement areas. Most situations paint a picture of smaller, localized concerns, but there is some consistency across districts in the general scope and nature of the problems faced. Commonly, schools find it difficult to staff specific classrooms, such as math, science, and special education, and districts with large concentrations of high-need

students face shortages of qualified teachers. Is this evidence of a statewide shortage?

The simple fact is that anecdotal and media reporting is not sufficient to establish that a statewide crisis exists. To do so requires a broader examination of the teacher pipeline, something that has not garnered as much attention or analysis by stakeholders, either at the local or state level.

This report uses publicly-reported state and federal data, along with relevant research, to look at trends and patterns along the teacher pipeline in Michigan, from the early phase of teacher preparation through hiring and professional development. It examines relevant aspects of both teacher supply and demand to inform stakeholders concerned about adequately staffing all public schools with qualified instructors.

The research does not show that Michigan is currently facing a statewide teacher shortage, but it does document some troubling trends along the teacher pipeline that are likely contributors to the challenges local schools face filling certain classroom vacancies.

Importance of Teachers and the Pipeline

Years of research have shown that quality teaching is an integral and productive input to student success,

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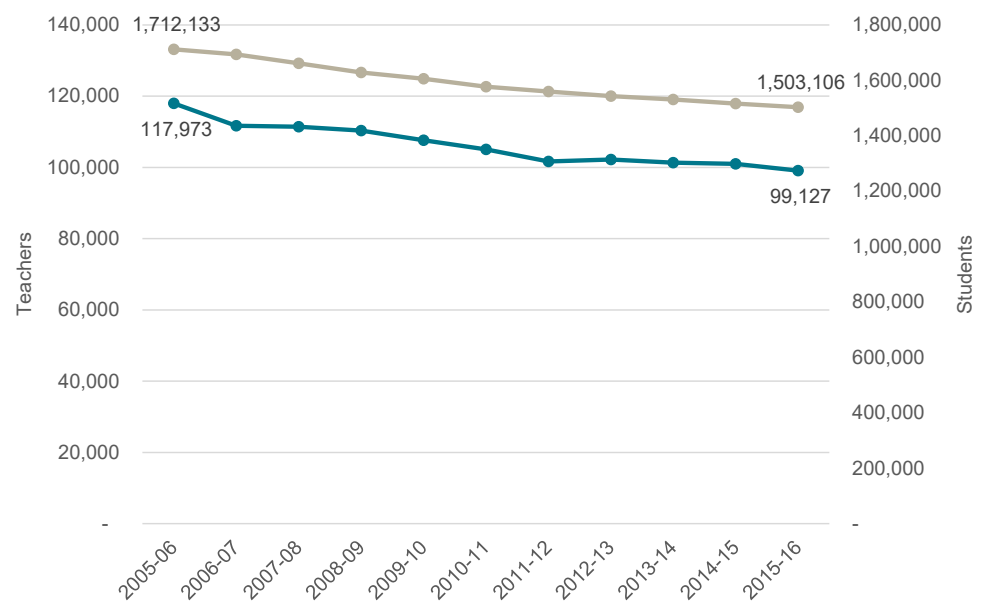
in school and beyond. It is also abundantly clear that success cannot be achieved if sufficient qualified teachers are not available to meet the learning demands of students. The need for teachers is universal, transcending geography, shifts in economic conditions, and political climates. This is why teacher shortages can be real, and costly, impediments to student success. Ignoring current and pending shortages runs the risk of jeopardizing the most productive ingredient in a child's education – the teacher.

Think of the teacher pipeline as linear, consisting of key phases: preparation, certification, recruitment and assignment, development, and retention. In many discussions of shortages, the issue is framed solely as an insufficient production of new teachers. While this is an important element, production is just one factor among many affecting the teacher labor market. Economists who study teacher labor markets look at all the factors involved, generally differentiating between those affecting the supply of teachers as well as the demand for teachers. Framing the discussion in terms of supply and demand broadens it beyond just supply-side factors.

Student Enrollment and the Teaching Workforce The number of K-12 students in Michigan has declined steadily over the past 10 years; **statewide public school enrollment fell** from just over 1.7 million students in fall 2005 to a bit more than 1.5 million in fall 2015, roughly a 12 percent decline. This can be largely attributed to the state's population loss during this period. Accompanying the enrollment decline, the **state's teaching force shrank 16 percent** over this period, from almost 118,000 to just over 99,100 teachers (**Chart A**). There are fewer teachers, but there are also fewer students enrolled in public schools.

Chart A

Michigan Public School Teachers and Student Enrollment, 2005-06 to 2015-16



Note: This chart combines data from Charts 1 and 8 in the body of the report.

Source: Center for Educational Performance and Information, Michigan Department of Education

Trends in Demand

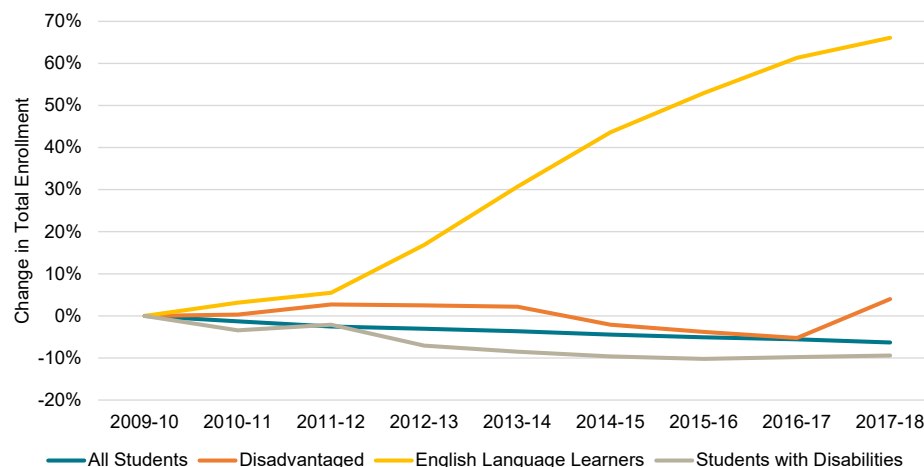
Based on current trends in student enrollment, shifts in student-teacher ratios, high teacher turnover and attrition rates, as well as state funding levels for K-12 schools, teacher demand is subject to a push-and-pull. Some factors are boosting demand while others are suppressing it.

Enrollment projections from the National Center for Education Statistics show the **number of Michigan students will continue to slip to just over 1.4 million** by the fall of 2027, an 8.2 percent drop from fall 2015. Absent other forces, this decline would be expected to suppress teacher demand going forward.

Concurrently, **the number of students identified as economically disadvantaged and the number of non-English speaking students has increased (Chart B)**. Generally speaking, these student populations require additional instructional supports and resources and demand for specially trained teachers to serve these students has risen, a trend likely to continue.

Chart B

Enrollment Change by Student Group since 2009-10



Source: Center for Educational Performance and Information, Michigan Department of Education

Student-Teacher Ratios Michigan school teachers are responsible for about two more students per classroom than the national-average, a ratio that **has been higher than the U.S. average** for some time. The pre-Great Recession ratio of 17.52 students per teacher in 2008-09 increased steadily to 18.25 in 2015-16 with the tightening of budgets and hiring pauses caused by the economic downturn. A public push to return to the pre-recession ratio would add 3,500 teachers to the workforce.

Turnover and Attrition A Michigan Department of Education study found that average teacher turnover among the state's public schools was 19.8 percent between 2012-13 and 2013-14 – **significantly higher than the national average of 15.7 percent**. Further, there is little indication of any reduction in turnover in the near future; Michigan's overall rate hardly fell in 2016-17 (19.3

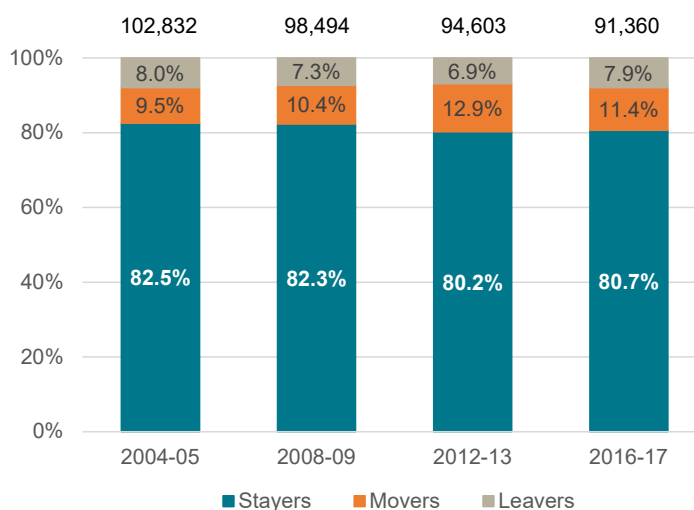
percent) (**Chart C**). Michigan's higher-than-average teacher turnover rate is not reflected in the statewide demand for teachers (one district's loss is another's gain), but it boosts teacher demand for the individual districts that the teachers are transferring from.

On average, about 16 percent of public teaching positions must be filled each year because of job changes or career exits. Teachers move on for any number of reasons, including retirements, district staffing decisions, personal and professional reasons. The percentage of leavers has remained fairly stable at around eight percent in recent years. It's movers who are chiefly responsible for the growing workforce instability; the share of the workforce that moved from one school to another increased from 9.5 percent in 2004-05 to 11.4 percent in 2016-17, more than 50 percent greater than the national figure (8.1 percent).

Another state report highlighted the considerable variation in turnover rates across districts by locale (urban, suburban, rural) and by school governance structure (traditional compared to charter public). It showed that

Chart C

Michigan Teacher Turnover, 2004-05 to 2016-17 (selected years)



Note: This chart is presented in table form in the body of the paper.

Source: Reproduced from 2017 Michigan Department of Education report, *Teacher Turnover in Michigan*

urban districts had the highest teacher turnover (24.3 percent), followed by rural (16.1 percent) and suburban (15.4 percent). Also, charter schools had higher turnover than traditional public schools, regardless of the setting. The largest spread in turnover rates was in urban districts; traditional public schools averaged 20.1 percent turnover compared to 37.3 percent in charter schools.

Research into Michigan teacher turnover rates shows that the state-level **reforms implemented in 2010 through 2012 are not to blame for the overall increase** in rates observed in the early part of the decade. However, there is evidence that these policies were associated with **higher teacher exit rates in hard-to-staff schools** (i.e., schools with high concentrations of low-income students, poor academic performance, and high dropout rates).

Trends in Supply

The supply component of the state's teacher labor market may be considered in a number of ways. Researchers suggest that one way is to simply think about the total number of teachers needed to staff classrooms in a given year; for Michigan, this is about 100,000, a number that has been steadily falling for many years. A more refined examination of supply focuses on the pool of teachers that will be available to fill vacancies over the course of a year. This includes either new entrants or re-entrants to the workforce.

Overall, the data show a shrinking supply of new teachers to replace those who leave the profession or change schools. While state and federal information confirm that new teacher production is way down, another supply source (i.e., still-credentialed former teachers living in state) remains largely untapped. Although little is known about the nearly 100,000 individuals who comprise this potential supply source, it certainly could take up some of the slack from fewer new entrants to the profession. Specific research findings include the following:

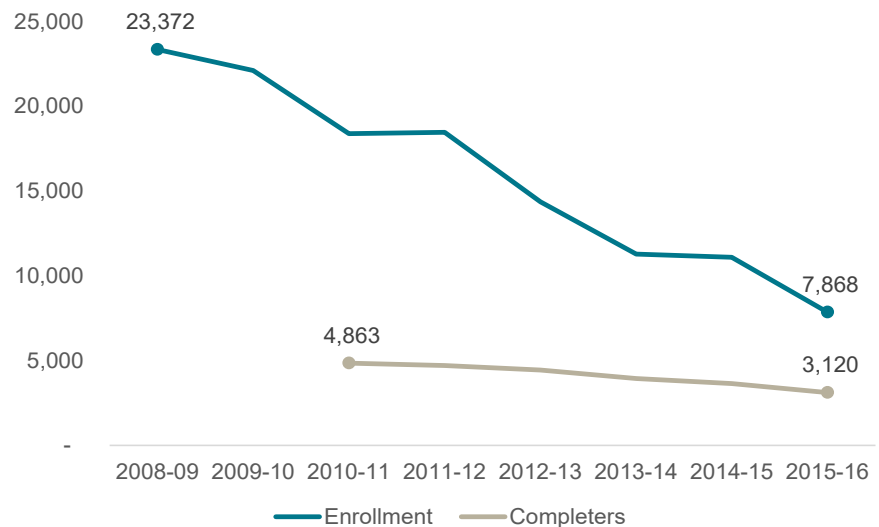
New Teacher Production Between 2008-09 and 2015-16, **enrollment at teacher prep programs is down**

66 percent. This follows a broader trend in Michigan postsecondary education enrollment (8.1 percent decline), but to a much greater extent. Michigan is not alone; a national survey highlights that the number of high school students interested in an education major dropped to its lowest level on record in 2015. Enrollment in teacher preparation is down nationally as well – 30 percent between 2008-09 and 2013-14.

Looking at the number of students who complete their formal teacher training provides a clearer view of future supply further along the pipeline. Given the enrollment picture, it is not surprising that the number of program completers also is down 30 percent from 2010-11 to 2015-16. Just over **3,100 individuals completed** the requirements for their teacher prep program in 2015-16 (**Chart D**).

Chart D

Enrollment and Completion at Michigan Teacher Preparation Programs



Source: U.S. Department of Education, Title II Higher Education Act Report Card

Alternative Certification Programs Since 2010, Michigan has opened up another teacher supply line by authorizing alternative teacher certification pathways. While growing in number from one program in 2010 to eight today, these institutions have not produced a large number of working teachers. **Only 231 educators (out of nearly 100,000 teachers) had obtained an interim certificate in 2017-18 from an alternative certification program.**

New Teachers by Subject Area Michigan programs continue to produce more elementary teachers than any other subject area, but it is not clear how much these programs can do, or are willing to do, to address mismatches between supply and demand for specific teachers.

Teacher Certification Once freshly minted, graduates of teacher prep programs may pursue state certification, a requirement before they can enter the classroom. The number of initial teaching certificates peaked in 2003-04 (9,664 certificates) and has since **declined 62 percent to 3,696 certificates in 2015-16**.

Subject Area Endorsement Certified teachers are required to obtain endorsements to teach specific subjects. Overall endorsement activity is down 44 percent from 2011-12 to 2015-16, something you would expect given trends in program completions and state certifications. This data also provides insight into **supply lines for shortage areas identified by the state (Table A)**.

The state's new-teacher supply has shrunk considerably in recent years and there is nothing to suggest that current trends will reverse course soon. Given this trend and the need for schools across the state to fill

vacancies arising from multiple factors, another supply source may need to take up the slack. As stated above, former, still-credentialed teachers would seem to be a natural partial solution, although we know little about who they are. Further state and local attention should be directed to this population.

A Statewide Shortage

As a state, Michigan continues to grapple with many public education issues (e.g., lagging student achievement, achievement gaps, funding, etc.). Public policies to address teacher shortages, whether originating on the demand or supply side of the equation, will require precise data. As a state, Michigan has not invested much time or financial resources to study the problem. The state does not produce a comprehensive updated study of teacher supply and demand.

The lack of public reporting and data surrounding teacher supply and demand makes it difficult to assess shortages. Clear-cut data is hard to come by. This report presents various components of teacher supply and demand that indicate a shortage, but nothing definitive to claim that one exists.

Table A

Program Graduates by Identified Shortage Area Subjects, 2011-12 and 2015-16

Shortage Area Subjects	2011-12		2015-16		Change
	Teachers	Share	Teachers	Share	
STEM*	1,988	16%	1,212	16%	(39%)
Special Education	672	5%	413	5%	(39%)
Early Childhood	421	3%	336	4%	(20%)
English as Second Language	119	1%	130	2%	10%
Total all Subjects	12,674		7,706		(39%)

* Generally, STEM includes the various science, technology, engineering, and math subject areas individually reported on the Title II report, but aggregated here.

Source: U.S. Department of Education, Title II Higher Education Act Report Card

Shortages by Field States are required to identify federally-designated teacher shortage areas. Michigan’s report, compiled using information supplied by local districts, suggests a **growing number of them over the last five years (Table B)**. Outside of a state-wide picture, this information is of marginal value as it provides no detail about the type of schools affected and, more importantly, where they are located (urban, rural, suburban districts).

Table B

Federally-Designated Teacher Shortage Areas, 2014-15 to 2018-19

Subject Matter	2014-15	2015-16	2016-17	2017-18	2018-19
Career and Technical Education	X	X	X	X	X
Special Education	X	X	X	X	X
English as a Second Language	X	X	X	X	X
World Languages	X	X	X	X	X
Mathematics			X	X	X
Arts and Music				X	X
Health and Physical Fitness				X	X
Language Arts				X	X
Social Studies					X
Science					X
Psychology					X
Core Subjects					X

Source: U.S. Department of Education

Policy Considerations

A number of entities are invested in and directly influence the health of Michigan’s teacher pipeline. Each has its own mission, constituencies, and interests. While each is linked in some way to the pipeline, given the nature of organizations generally it is not unreasonable to believe that many operate in silos. Addressing workforce imbalances will require partnerships between many of these entities.

Better and Timely Information As a state, Michigan has not prioritized studying teacher labor markets and the shortage issue. This is evidenced by the lack of available, timely and relevant information related to the various components of the educator labor force and the factors influencing them. A good first step would be to create a task force or workgroup charged with

examining shortages and providing potential solutions to various education stakeholders. This will require taking stock of current and requisite data needs within the state, among the intermediate school districts, and for individual school districts; settling on analytical methods; and reporting findings.

Getting Potential Teachers into the Pipeline Data presented in this report show that fewer high school students are entering college with the intention of entering the field. Leakage through the pipeline of getting them from entrance into a career is considerable.

Michigan has some of the highest student-loan debt in the country. For the class of 2017, Michigan ranks 11th nationally, with each graduate holding an average of \$31,289 in debt when leaving college. Some 58 percent of graduates owe money on student loans.

The state could augment the federal loan forgiveness programs for individuals seeking a teaching career. To qualify for the federal programs, borrowers must commit to work for five

consecutive years in a high-needs school and make regular subsidized loan payments. For the typical teacher, up to \$5,000 in student loan debt can be forgiven after completing the service requirement. Those teaching math, science, or special education can have up to \$17,500 forgiven.

Another debt-related intervention could be to develop a student debt assistance program to encourage people to stay in the profession. Debt assistance differs from loan forgiveness basically in the timing of the benefit; loan forgiveness occurs after a set period of service while debt assistance is provided in the form of an annual benefit while the individual continues with regular loan payments. Assistance programs can be structured to provide an increasing benefit after each full year in the classroom, with a maximum cap based

either on total assistance or years participating. Annual bumps in the benefit may serve as an added incentive to keep teachers in the classroom.

In addition to loan forgiveness, a targeted scholarship modeled after the nationally recognized Kalamazoo Promise could incentivize students to enroll in and complete the requirements for teacher preparation. A statewide promise program could be developed or individual teacher preparation programs created to train teachers for high-demand classrooms or to teach in high-need schools. If paired with a “grow your own” strategy described below, students from high-need communities across Michigan could be rewarded for academic success and returning to their communities to give back.

Tackling Michigan's High Turnover Rate: Focus on Retention Michigan's teacher turnover rate is high and a significant cause of staffing problems. It is particularly problematic in the state's charter schools, urban schools, and those with high concentrations of poverty.

Michigan does not have a statewide teacher salary schedule like many states, which means pay and compensation structures are determined locally. Generally, retention is better when salary and benefits are competitive with other occupations requiring the same educational background, training, and experience. In addition to ensuring starting salaries are competitive, differential pay systems can be employed. These take into account the job prospects and earning potential that certain teachers have outside the school setting, such as those trained in specific high-demand content areas (e.g., science, technology, special education). Implementing differential pay, especially for entry-level positions, may require schools to break from the traditional model based entirely on experience and education. Differential pay is an especially important strategy when retention is a challenge in hard-to-staff subjects or school settings.

As was discussed earlier, retention of teachers in the first couple of years is an issue across the state, but

some districts are especially plagued by high attrition rates. One strategy the state can pursue is to invest more in teacher preparation, support and development strategies that target retaining teachers in high-need settings and shortage areas. High-quality teacher residency programs are a promising approach employed across the country, requiring schools to partner with preparation programs to provide aspiring teachers the chance to learn in the same environment where they will eventually work.

Another promising model of teacher preparation involves recruiting individuals into the profession from a school's immediate community, such as current students or employees. The “grow your own” approach requires schools to work with teacher prep programs – traditional and alternative – to ensure schools' unique staffing needs are met. The majority of teachers who grew up in urban or rural settings go on to work in these communities.

Like any organization, local schools have their own culture, practices, policies, and characteristics that can be influential in a teacher's decision to remain in the classroom. Unlike changes to salary schedules or recruitment and preparation, a school's organizational conditions are less costly to modify and directly under the control of local schools. It has been demonstrated that schools with “positive” organizational conditions – teachers provided with more school-wide decision-making authority and classroom autonomy – have lower turnover rates, especially among minority teachers.

Action is needed to ensure a robust, well-prepared teacher workforce now and into the future. Michigan could invest in rapidly building the supply of qualified teachers in the fields and locations where they are most needed, while creating incentives for experienced, effective teachers to re-enter and remain in the classroom. Additionally, it is abundantly important to this endeavor that Michigan invest in data, information, and analysis to diagnose workforce problems and guide the appropriate interventions.

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MICHIGAN'S LEAKY TEACHER PIPELINE

EXAMINING TRENDS IN TEACHER DEMAND AND SUPPLY

Introduction

As public K-12 teachers and students across Michigan returned to school in the fall of 2018 they were greeted by a barrage of headlines warning of current or impending teacher shortages:

"Michigan school districts battle widespread teacher shortages"^a

"Across Michigan, school districts large and small struggle to put teachers in classrooms"^b

"Southwest Michigan schools face the teacher shortage"^c

The shortage drumbeat seems to be fairly consistent. While some school districts have endured longstanding challenges staffing classrooms, many others only recently began reporting regular and predictable difficulty finding qualified teachers to fit their schools' needs. A growing number of districts indicate that their staffing problems extend beyond the fall and last well into the school year. These reports are accompanied by claims of expanding class sizes, but often are supported by a handful of hard facts. Most situations paint a picture of smaller, localized concerns, but there is some consistency across districts in the general scope and nature of problems faced. Commonly, schools find it difficult to staff specific classrooms, such as math and science, and districts with large concentrations of high-need students face shortages of qualified teachers.

This anecdotal and media reporting is not sufficient to establish that a statewide crisis exists. To do so requires a broader examination of the teacher pipeline, something that has not garnered much attention or analysis either at the local or state level.

Public discussion and debate of shortages can benefit from an informed understanding of teacher labor markets and the state's teacher pipeline. As stakeholders move beyond discussion to considering, developing, and implementing changes to the educator profession, having this basic understanding takes on even more relevance and importance. Michigan arguably has been

...the public data collected by the State of Michigan and the federal government is not sufficient to assess needs for specific districts or even regions of the state.

at the epi-center of a national trend in education policy, enacting major reforms to the public teacher profession since 2010. Much, though not all, of the reform activity has occurred without a general understanding of the state's teacher pipeline and how public policies might affect various aspects of labor supply and demand.

This report, primarily descriptive in nature, helps to fill that void. Using publicly-reported state and federal data, and drawing upon relevant research, this report looks at trends and patterns along the teacher pipeline in Michigan, from the early phase of teacher preparation through hiring and professional development. Issues surrounding the state's teacher pipeline are addressed by examining compositional changes in the public school teaching force, highlighting factors affecting teacher supply and demand, and identifying existing indicators of teacher shortage.

a Chambers, J. (2018) "Michigan school districts battle widespread teacher shortages." Detroit News. September 10, 2018. Retrieved from <https://www.detroitnews.com/story/news/education/2018/09/10/teacher-shortage-michigan-schools/1203975002/>

b Cwiek, S. (2018) "Across Michigan, school districts large and small struggle to put teachers in classrooms." Michigan Radio, Stateside. August 21, 2018. Retrieved from <http://www.michiganradio.org/term/teacher-shortage>

c Newman, A. (2018) "Southwest Michigan schools face the teacher shortage." Herald Palladium. November 11, 2018. Retrieved from https://www.heraldpalladium.com/news/local/southwest-michigan-schools-face-the-teacher-shortage/article_4aa1fd7c-7632-5260-b15d-c2b2a441a5af.html

Initially, the intent of this report, prompted by much media coverage, was to dive deep and investigate teacher shortages in varying regions of the state and across specific subject areas within local schools. As covered further below, the public data collected by the State of Michigan and the federal government is not sufficient to assess needs for specific districts or even regions of the state. Some conclusions may be

drawn about types of districts based on certain characteristics, such as location and student composition. Still, we hope the research and analyses here will provide insight for stakeholders and spark a much-needed conversation about the future of the state's public school teaching workforce and the importance associated with adequately staffing all public schools with qualified instructors.

Teacher Pipeline and the Michigan Teacher Workforce

Few would argue that a great teacher made a difference in their education. The intuitive knowledge that individual teachers are hugely important is confirmed by research demonstrating that the average gains in learning, even classrooms within the same school, are very different.¹ Some teachers produce bigger gains in student learning than other teachers year after year. The magnitude of the differences is truly large, with some teachers producing 1.5 years of gain in achievement in an academic year while others with equivalent students produce only one-half year of gain. In other words, two students starting at the same level of achievement can know vastly different amounts at the end of a single academic year due solely to the teacher to which they are assigned. If a bad year is compounded by other bad years, it may not be possible for the student to recover. No other attribute of education comes close to having this much influence on student achievement.

Research has further quantified the economic impact of teacher quality.² It finds that above average teachers produce increased average earnings for their students. A teacher who is at the 60th percentile raises individual earnings by \$5,292 annually, and this translates into a present value of \$105,830 for a class size of 20 students. A teacher above the mean (84th percentile) produces over \$400,000 in added earnings for her class of 20. Because this represents an annual increment by the teacher, if she stays at the higher performance level the gains will be realized each year. On the flip side, below average teachers cause decreases in lifetime earnings. Thus, having an effective teacher followed by

an equally ineffective teacher will cancel out the gains. An alternative way of estimating the derived demand for effective teachers focuses on the impact of student performance on economic growth. Recent analysis has demonstrated a very close tie between cognitive skills of a country's population and the country's rate of economic growth.

Just as research has shown that quality teaching is an integral and productive input to the success of students in K-12 education, college, career, and life, it is also abundantly clear that success cannot be achieved if sufficient qualified teachers are not available to meet the learning demands of students. The need for teachers is universal, transcending geography, shifts in economic conditions, and political climates. This

Ignoring shortages when they exist runs the real risk of jeopardizing the most productive ingredient in a child's education, the teacher.

is why teacher shortages can be real, and costly, impediments to student success in the classroom as well as later in life in terms of economic wellbeing. Ignoring shortages when they exist runs the real risk of jeopardizing the most productive ingredient in a child's education, the teacher.

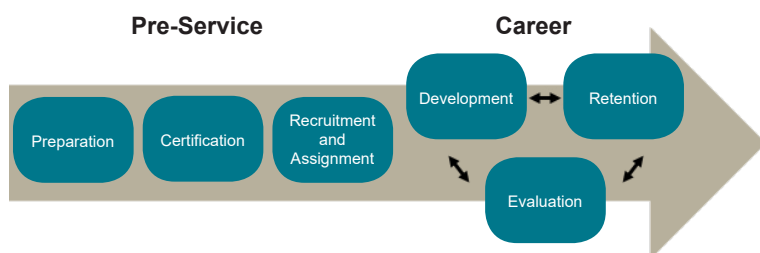
The Teacher Pipeline and Shortages: Conceptually

The teacher pipeline can be conceptualized in many different ways, but often it is illustrated in a linear fashion consisting of a number of key phases: preparation, certification, recruitment and assignment, development, and retention. In such illustrations, each pipeline phase consists of multiple components. For example, the preparation phase involves recruiting prospective teachers to teacher preparation institutions, train-

ing effective teachers, and certifying teachers to be eligible to work in local schools. Similarly, the other core pipeline phases (e.g., recruitment) include various sub-elements (e.g., hiring, on-boarding, training). Conceptually, the teacher pipeline might look like what is portrayed in **Figure 1**.

Figure 1

Teacher Pipeline



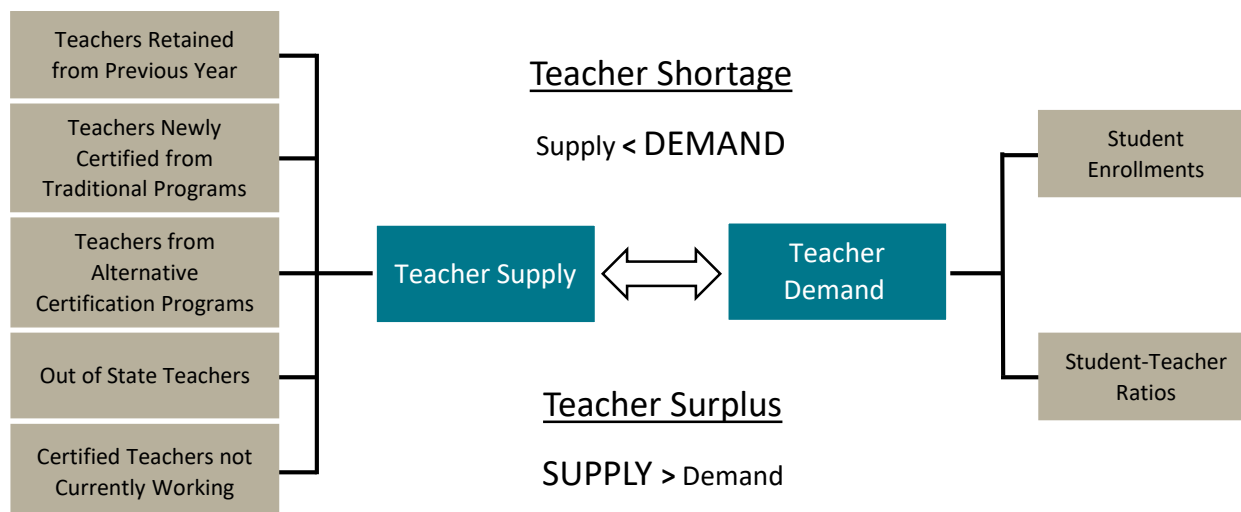
While the components of the pipeline might be well understood, the health of the pipeline generally, and the health of specific components in particular, are less well known. The health of each component, and therefore the pipeline overall, is influenced by a variety of factors beyond education, including regulatory decisions, public policies, economics, and demographics, to name a few. This report does not endeavor to completely cover every phase of the teacher pipeline in detail; however, it does aim to examine various aspects of the teacher pipeline, along with many of the factors influencing them, to better understand the most salient questions,

concerns, and perspectives related to trends in teacher demand and supply as well as teacher shortages in the Michigan. The broad conceptualization of the teacher pipeline presented here is intended to help provide context for the discussion that follows.

In many discussions of teacher shortages, the issue is often framed in terms of an insufficient production of new teachers. While this is an important element, teacher production is just one of a myriad of factors affecting the teacher labor market at any given time. Economists who study teacher labor markets look at all the factors involved, generally differentiating between those affecting the supply of teachers (e.g., production of new teachers) as well as the demand for teachers (e.g., student enrollment). Framing the discussion in terms of supply and demand factors broadens the discussion of teacher shortage beyond just supply-side factors. Education researcher Linda Darling-Hammond and her colleagues at the Learning Policy Institute suggest that teacher shortages occur when “there is an imbalance between the number of teachers demanded and the number of qualified teachers willing to offer their services to fill these positions,” adding that a shortage can be location- or occupation-specific.³ A conceptual model for determining whether an imbalance between supply and demand exists is presented in **Figure 2**.

Figure 2

Components of Teacher Supply and Demand



Source: Adapted from Regional Education Laboratory Midwest, *Strategies for Estimating Teacher Supply and Demand Using Student and Teacher Data* (2017)

In theory, teacher demand is defined as the number of teachers required to adequately staff schools based on student enrollments and student-teacher ratios. Estimating demand requires examining the number of teachers retained from the previous year and projecting the number of new teachers required to meet student enrollment projections. The number of additional teachers required in any given year (because of attrition and/or increased enrollment) is based on desired student-teacher ratios (a value-based determination).

Similarly, the concept behind teacher supply is fairly straightforward. The supply of teachers is represented by the pool of employed teachers, newly trained teachers from teacher preparation programs located within a state, teachers pursuing training through alternative routes, teachers trained in out-of-state teacher preparation programs that relocate to a state, and experienced teachers who left the profession and are returning. All of these factors are important and salient to the discussion of teacher supply.

How Many Public School Teachers Work in Michigan?

This may sound like a fairly straight-forward question that should prompt a definitive answer, but the nature of the answer mostly depends on whom you ask. Specifically, the level of government (e.g., federal, state, local district) and/or the public agency responding to the question. Even at the same level of a government, different public reports provide contradictory answers based on the type of teacher being counted (e.g., general education, special education, career and technical teachers). The bottom line is that the answer to this seemingly basic question can vary substantially because of how teacher data is aggregated and reported.

All information collected by the State of Michigan related to Michigan public school personnel, including teachers, is housed in the Registry of Education Personnel (REP) maintained by Center for Educational Performance and Information (CEPI) within the Department of Technology, Management and Budget. The REP contains basic employment elements, including employee assignment, professional development, and measurement data. The

data is collected from all public school districts twice a year in the fall and at the end of the school year.

While all Michigan public school teacher data comes from a single source, there are various staffing-related reports produced by the state government and the federal government that define staffing terms differently and that rely on different REP data elements. These definitional and reporting differences allow for multiple responses to the question, “How many public school teachers work in Michigan?”

The number of additional teachers required (because of attrition and/or increased enrollment) is based on desired student-teacher ratios (a value-based determination).

For the descriptive elements of Michigan's K-12 teaching workforce in this report, the REP Summary Report is used as the data source.^d For the “teacher” category, the report groups together a number of position descriptions, including personnel

assigned as general education, special education, and career/technical education teachers and other instructional staff. Additionally, the category includes guidance counselors, librarians/media specialists, and certain student support services staff. The common thread across these various staffing positions is that each provides some degree of classroom instruction and therefore, for purposes of reporting, are included in the state's “teacher” designation in the summary.^e

d The summary report organizes school personnel into six broad categories – Administrators, Teachers, Day-to-Day Substitute Teachers, Professionals/Aides, Day-to-Day Substitute Professionals/Aides, and Non-instructional. Michigan Center for Educational Performance and Information, *REP Summary Report 2017*. Retrieved from <https://www.mischooldata.org/Other/DataFiles/StaffingInformation/HistoricalStaffingSummary.aspx>

e It should be noted that personnel data is collected on a head count basis as well as a full-time equivalency (FTE) basis. Public school employees may have multiple assignments within a school district and the FTE data accounts for this reality by proportionately assigning individuals to the appropriate position category (e.g., an employee may work as both a teacher and administrator) based on the portion of their time spent in a particular assignment. Also, it can be the case that a school employee has less than a full-time position and state reporting captures this through the FTE count. With the head count data, a full-time and part-time employee are counted the same.

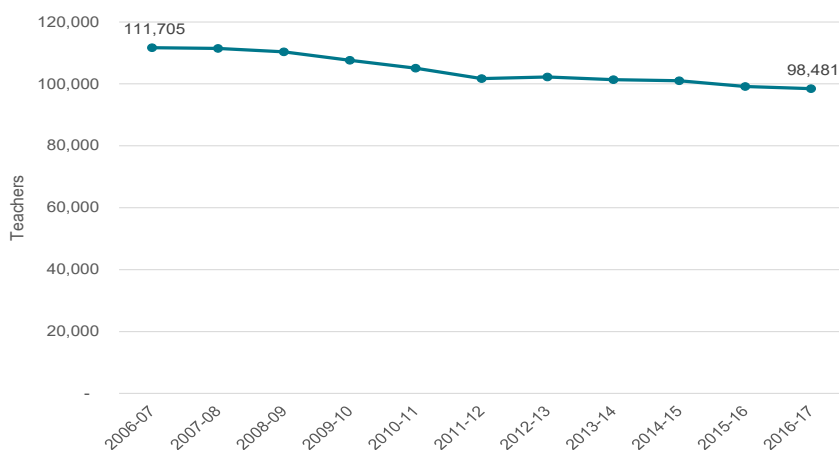
Michigan's Teacher Workforce

According to the most recent state staffing count, a total of 333,376 people worked in Michigan public schools assigned as teachers, administrators, non-instructional personnel, paraprofessionals/aides and substitute teachers. Teachers represent about 31 percent of the total public school workforce, the second largest group behind non-instructional staff (34 percent). The teaching workforce has been shrinking since the mid-2000s in response to a number of factors, most notably the shrinking school age population throughout the 2000s.

In the 2006-07 school year, public school teachers numbered 111,705 statewide. Since then, the workforce shrank by just over 13,200 teachers or 11.8 percent (**Chart 1**). There were 98,481 K-12 classroom teachers working in Michigan public school districts (traditional and charter) in the 2016-17 school year, the most recent year for which data is available.^f

Chart 1

Michigan Public School Teachers, 2006-07 to 2016-17



Source: Center for Educational Performance and Information, REP

^f This is a head count, as opposed to the full-time equivalency (FTE) count of teachers. Statewide, there were approximately 95,300 teacher FTEs compared to 98,481 based on head count in 2015-16. Also, it should be noted that the teacher count includes all instructional assignments (e.g., general education, special education, career and technical education).

While smaller, Michigan's current K-12 teaching workforce looks very similar to what it did 10 years ago; almost entirely white (92 percent) and majority female (77 percent). Beyond the physical appearance of the "typical" classroom teacher, other attributes of the workforce have changed very little over time, including the average age, classroom experience, and educational background.

Racial Composition Michigan's public school teaching workforce is not especially diverse, something that is generally true of the K-12 teacher workforce across the country. In both instances, the racial composition of the teaching force has been relatively homogenous and not as racially diverse as the population at large, the state's overall workforce, nor the students enrolled in public schools.

Nationally, white, non-Hispanic teachers accounted for just over 80 percent of the 3.8 million public school teachers in 2015-16. In contrast, white, non-Hispanic students comprised just under 50 percent of the total 50.3 million students enrolled in public schools across the United States. Similarly, 60 percent of the U.S. general population is white, non-Hispanic.

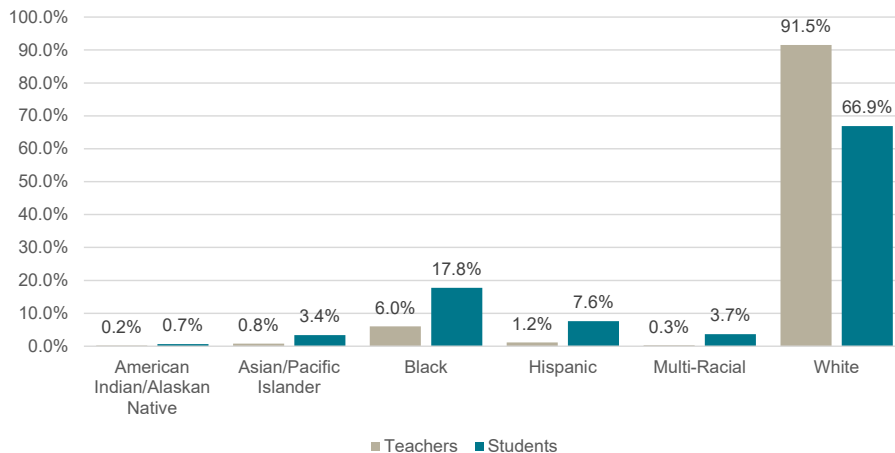
Chart 2 (see page 6) shows the racial composition of Michigan public school teachers in the 2016-17 school year compared to the racial composition of the state's K-12 students. In the aggregate, students of color represent just over one-third of the total student enrollment across all public schools in the state.^g In total, teachers of color, comprise just 8.5 percent of all K-12 teachers in the state, well short of the overall share of minority student enrollment (33 percent). Clearly, in many Michigan classrooms, the instructors do not look like the students they are teaching.

Compared to the state's overall population and its civilian workforce, public school teachers, collectively, are also less diverse. In 2015, roughly 82 percent of the population and 84 percent of the overall workforce identified as white, non-Hispanic, well below the percentage of white, non-Hispanic teachers. All groups

^g "students/teachers of color" refers to those who do not identify as white, non-Hispanic.

Chart 2

Michigan Public School Teachers and Students by Race, 2016-17



Source: Center for Educational Performance and Information, REP

of minority populations were underrepresented in the public school setting compared to their representation in the general population and the workforce. Black teachers, the largest minority group, were the least underrepresented minority grouping.^h Overall, 13.4 percent of the general population and 10.9 percent of the workforce identify as black, compared to 6 percent of teachers who identify as black.

Over the past 10 years, the racial and ethnic composition of students attending Michigan K-12 public schools has become more diverse, while the racial/ethnic composition of the teaching force has become less so. The non-white student population rose from 28.9 percent of total enrollment in 2007-08 to 33.1 percent in 2016-17. As the student population became more diverse, the percentage of non-white teachers shrank from 10.2 percent of the workforce to 8.5 percent (**Chart 3**).

The racial compositional changes in the statewide non-white student enrollment figures have been driven by an increase in the proportion of Hispanic, multi-racial, and Asian students; the proportion of Michigan's total student population that is black declined from 20 percent in 2007-08 to just under 18 percent in 2016-17. The changes within Michigan's non-white student

^h A ratio is used here to measure racial representation in public schools by dividing the total percentage of students by the total percentage of teachers for each race/ethnicity. The calculated ratios are: Black (3.0:1), Hispanic (6.3:1), multi-racial (12.3:1), Asian (4.3:1), and Native American (3.5:1).

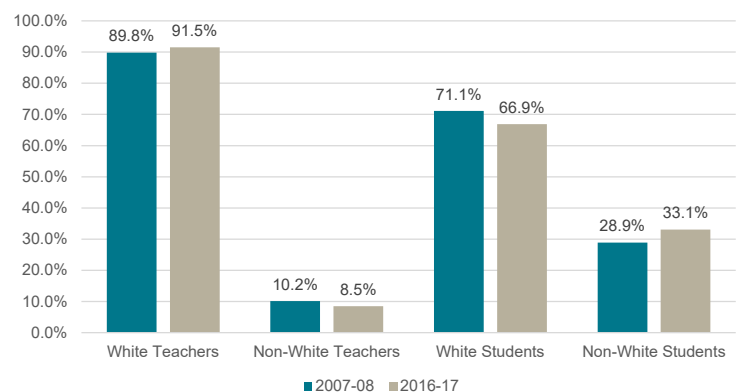
population mirror the changes in Michigan's overall non-white population during the same period and generally track national trends. Of particular note has been the marked rise in the share of Hispanic students in Michigan; they experienced a three percentage point increase in their share since 2007-08.

Racial Diversity of the Educator Pipeline Insights into the racial makeup of the state's future teacher workforce can be gleaned by examining various components along the educator pipeline, from recruiting students for Michigan teacher preparation programs to school hiring decisions and classroom assignments. Along

this continuum, however, there can be noticeable shifts in the overall racial composition of the pipeline population as individual participants exit due to a host of factors, including decisions to change majors in college or career paths after graduation. These compositional changes help contextualize the makeup of the current workforce, but also serve as markers for policymakers and stakeholders seeking to address diversity concerns about the pipeline and the future workforce. Public policies and other interventions can target changes at these inflection points in efforts to address the lack of diversity.

Chart 3

Change in Racial Composition of Michigan Public School Teachers and Students, 2007-08 to 2016-17



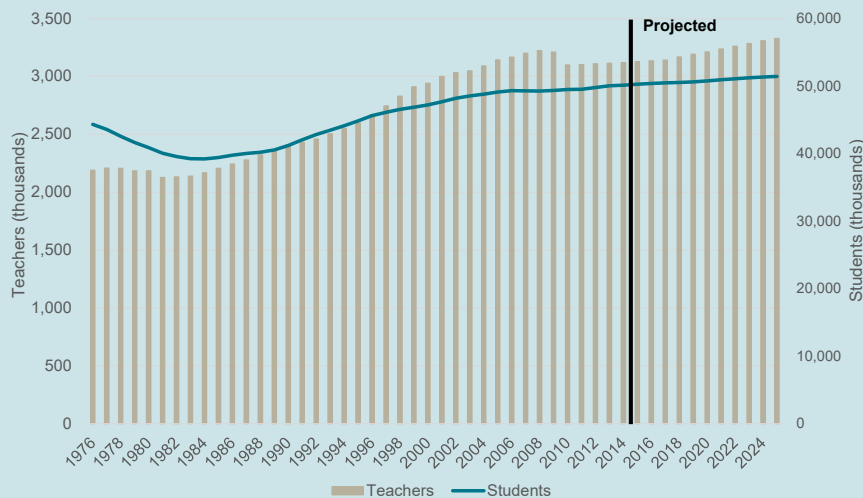
Source: Center for Educational Performance and Information, REP

Teaching Force: National Context

The number of public school teachers in the U.S. hit its peak in 2008 (3.22 million teachers), just prior to the Great Recession.ⁱ The tumultuous economic shifts caused job losses, slowdowns in business investment and lower corporate profits. These forces combined to depress state and local government tax collections and revenue growth, pressuring governments to cut spending on public services and curtail hiring. Local school districts across the country were not immune from the economic downturn and similarly reduced spending. For many school districts, reduced or slow funding growth meant downsizing staffing ranks and laying off school personnel, including teachers, in the years that followed the recession. As result, the national teaching force declined in 2009 and 2010.

Chart 4

U.S. Public Elementary and Secondary Teachers and Students, 1976 to 2025 (projected)



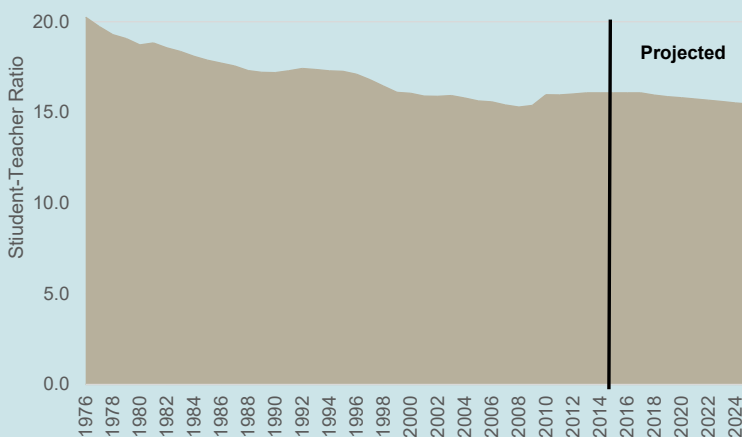
Source: U.S. Department of Education, National Center for Education Statistics

Coming out of the recession, the supply of teachers has continued to inch up each year. Despite this growth, there are an estimated 87,000 fewer teachers in 2016 than in 2008 (pre-recession). Current projections show that the number of teachers nationally will surpass the pre-recession level in 2021 at 3.24 million teachers. The teaching workforce will continue growing until it reaches 3.33 million teachers by 2025 (see **Chart 4**).

Chart 4 also displays public school enrollment since 1976. For the most part, the long-term enrollment trend matches that of the supply of teachers. Total enrollment slightly dropped in the two years before the national recession (2007 and 2008), but this loss was erased by 2009. Today, there are an estimated 50.39 million public school students.

Chart 5

U.S. Public School Student-Teacher Ratio: 1976 to 2025 (projected)



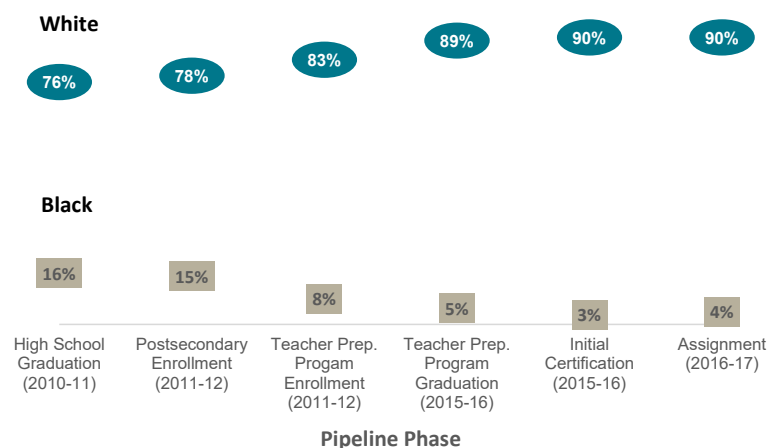
Source: U.S. Department of Education, National Center for Education Statistics

Long-term growth in the teaching workforce has outpaced student enrollment growth. This is observed in the U.S. student-to-teacher ratio presented in **Chart 5**. While the ratio has remained fairly stable since the end of the Great Recession in 2010 (about 16 students per teacher), it had been falling steadily for some time. In fact, just before the recession, the ratio declined to 15.3, the lowest level in history. With the reduction in the teaching workforce coming out of the Great Recession, the ratio jumped to 16. Looking forward, the ratio is projected to slowly decline as the teacher workforce grows faster than enrollment through the fall of 2025 according to federal estimates.

i According to the National Bureau of Economic Research, the recession officially began in late 2007 and lasted until mid-2009.

A recent Michigan Department of Education analysis sheds light on where, and to what extent, shifts occur in the pipeline.⁴ The research tracks the percentage of the pipeline population at each phase that is either black or white. Beginning upstream in the pipeline with an illustrative cohort of high school graduates (recruitment phase), the racial composition of this grouping of participants is followed at each subsequent phase through to their employment in a public school (assignment phase).¹ The results are reproduced in **Figure 3** to highlight the magnitude of the racial shifts occurring in the state's teacher pipeline.

Figure 3
Racial Composition of Teacher Pipeline at Different Phases



Source: Reproduced from 2018 Michigan Department of Education report, *Racial Characteristics of the Michigan Teacher Workforce*

It is clear from the figure that the proportion of teacher candidates of color decreases at multiple points along the pipeline. The percentage of black participants, initially estimated at 16 percent early in the pipeline, decreases steadily until settling at four percent at the teacher hiring phase. The most significant change in the racial composition occurs between enrollment in general postsecondary and enrollment in teacher preparation programs; the percentage of black students

enrolling in teacher preparation programs (8 percent) is about one half of the black student enrollment in higher education more generally (15 percent).

Just as Michigan exhibits a disconnect between the racial composition of its public school workforce and that of its student body, overall population, and the broader state workforce, the U.S. teacher workforce faces the same mismatches. The future national workforce becomes less diverse at each stage in the teacher pipeline and that the current racial disconnects are not likely to self-correct given current trends.⁵ In fact, national education leaders have cautioned that because the student population is estimated to become less white and more diverse in the coming years “the disparity between the racial makeup of students and teachers may increase further, fueling the need for substantially more progress in increasing teacher diversity.”⁶

There is much to gain by increasing educator diversity, especially among majority-minority schools. Chief among the benefits is improved academic performance for students, especially as it relates to closing the achievement gap, as well as greater equity in the workplace. Effective solutions, however, will require attention to the appropriate phase of the pipeline. Leading researchers on minority teacher shortages suggest a dual strategy focused on recruitment and retention.⁷ This paper does not endeavor to examine the full spectrum of causes, considerations and consequences associated with the lack of diversity throughout the pipeline. The main point here is that regardless of what can be said about a general teacher shortage in Michigan, the lack of diversity at various points along the teacher pipeline and within the existing educator workforce merits more attention. This will require stakeholders to investigate the extent to which conditions, policies, rules, and practices are driving the differences observed.

Age Just as Michigan's population is aging with seniors and older workers representing the largest and fastest growing segments, its teaching force is getting older. The “graying” of the profession is a demographic trend commonly cited as contributor to shortages in many states. The logic follows that with an aging workforce, a larger share of educators become eligible for retire-

i The cohort analysis begins with the 2010-11 high school graduating class, progressing through the following stops along the pipeline: postsecondary enrollment (2011-12), teacher preparation program enrollment (2011-12), teacher preparation program graduation (2015-16), initial certification (2015-16), and finally assignment (2016-17).

ment each year (i.e., they reach minimum retirement age under a defined benefit pension plan) and exit the classroom. A spike in retirements creates more classroom vacancies that must be filled. If the supply of new teachers or re-entrants to the workforce is not sufficient to replace these retirees, shortages may develop.

Teacher retirements consistently account for less than 20 percent of the combined annual turnover and attrition in U.S. public schools; pre-retirement exits playing a much larger role. While retirements play a role, they are not the driving force behind shortages. One examination of recent trends put it more bluntly by suggesting that the “dire warnings” of shortages resulting from an aging teacher force may no longer be true.⁸ Still, the “graying” demographic trend merits attention.

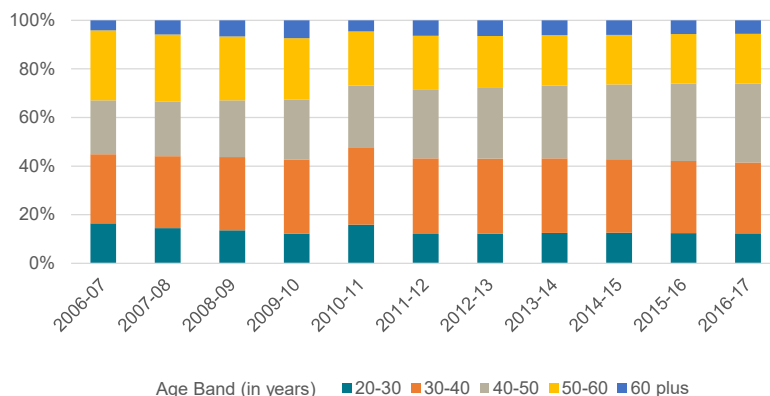
Michigan is aging as the median age of the state’s population increased from 37.3 years in 2006 to 39.7 years in 2016.⁹ Public data is not available on the median age of school personnel, but age demographic information for teachers by 10-year age groupings illustrate shifts taking place in public schools over the same timeframe.

Teachers in the youngest two age bands (20-30 years of age and 30-40 years of age) represented 45 percent of the total workforce in 2006-07 compared to 41 percent for the most recent year. At the other end of the age distribution, the two oldest age bands combined (representing teachers 50 and over) went from representing 33 percent of the total to 26 percent of the total over this period. With contractions at both ends of the distribution, the “graying” of the state’s teacher force is largely driven by “middle-age” educators (40-50 years of age); this age group increased from 22 percent to 32 percent of the total (see **Chart 6**).

The only exception to the general aging trend came in 2010-11 with the state early retirement incentive offered through the Michigan Public Schools Employees Retirement System (MPERS). Participation in this early out program reduced the number of older teachers in classrooms; the share of teachers 50 years and older dropped from 33 percent of the total in 2009-10 to 27 percent in 2010-11. Schools replaced many of the departed workforce with younger teachers; the proportion of youngest teachers (20-30 years of age)

Chart 6

Michigan Public School Teachers by Age Cohort, 2006-07 to 2016-17



Source: Center for Educational Performance and Information, REP

went from 12 percent in 2009-10 to 16 percent of the total in 2010-11. Following the early out program, the share of the workforce in the youngest two bands (basically teachers 40 years and younger) jumped from 43 percent to 48 percent.

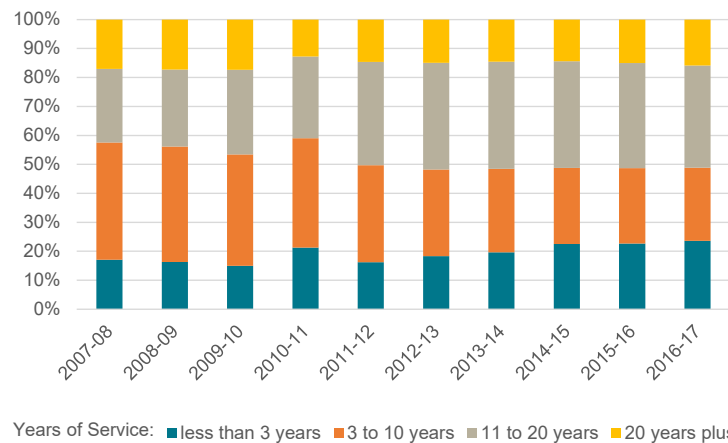
“Middle-age” teachers represent a significant aspect of the current workforce. Today, nearly one-third of the teaching force is in its 40s. Given that average MPERS retirement age is 60 years old, it is likely that even the oldest educators within this “middle-age” group are still years away from meeting the minimum age and service time requirements to be eligible to receive pension benefits. Despite the fact that many in this group are not likely to retire in the immediate term, collectively, they represent a large and growing portion of the current workforce that will need to be replaced as they exit the classroom in future years.

Classroom Experience Generally, Michigan’s K-12 teaching workforce is a little more experienced today than it was ten years ago. Just over 50 percent of Michigan teachers have more than 10 years of experience, compared to 42 percent of the workforce in 2007-08 (see **Chart 7** on page 10).^j

There are a couple of things to highlight in **Chart 7**. First, as a share of all teachers, more new, inexperienced

^j Unfortunately, Michigan does not publicly report the average number of years of teaching experience which would be a better indicator of average teacher experience.

Chart 7
Distribution of Michigan Public School Teachers by Years of Service, 2007-08 to 2016-17



Source: Center for Educational Performance and Information, REP

teachers are in the classroom today compared to 10 years ago. Teachers with the least classroom experience (fewer than three years) comprised 17 percent of the total workforce in 2007-08, but make up nearly one-quarter (24 percent) of all public school teachers in 2016-17. This grouping of teachers became a larger proportion of the total as a result of the 2010 early retirement program that prompted many experienced teachers to leave the profession. Local districts backfilled these positions with less experienced teachers. As result, the share of teachers with fewer than three years of classroom experience increased from 15 percent in 2009-10 to 21 percent in 2010-11. Since that time, this group has grown to represent 24 percent of the total workforce in 2016-17.

Also, the share of teachers in the next lowest category of experience (3 to 10 years of experience) has declined considerably; from 40 percent in 2007-08 to 25 percent in 2016-17. This suggests that many teachers are leaving the workforce sometime between their fourth and ninth year in the classroom. Such a sharp decline in the novice teacher ranks (nearly 15 percentage points) represents a real challenge for workforce stability and sustainability. Strategies focused on retaining these experienced teachers would improve the health of the

workforce. More importantly, experienced teachers are key to student success in the classroom.

Teacher Qualifications In general, teachers must have at least a Bachelor’s degree to enter the profession. In 2016-17, 97 percent of current Michigan teachers had either a Bachelor’s or Master’s degree (see **Table 1**). Since 2005-06, Michigan teachers have become more credentialed as the percentage of the workforce with a Master’s degree has increased from 53 percent to 59 percent. Correspondingly, the share with a Bachelor’s degree or less shrank from 45 percent to 39 percent.

One explanation for the increased prevalence of advanced degrees is that many collective bargaining agreements negotiated between local districts and teacher unions contain provisions guaranteeing salary increases for those individuals attaining Master’s degrees. Teachers with a Bachelor’s degree have a financial incentive to add academic credentials, such as an advanced degree.

One of the most contentious issues in education continues to be the relative value of training in subject matter content versus training in teaching. According to education historian Diane Ravitch, “We don’t have a problem of teachers lacking degrees. Teachers today have more degrees than ever before in our history; the Bachelor’s degree is ubiquitous, and about half even have a Master’s degree. We do, however, have a problem with the academic preparation of teachers: only a minority - 39% - have a Bachelor’s or graduate

Table 1
Michigan Public School Teachers by Highest Degree Earned, 2005-06 and 2016-17

Degree	Number of Teachers		Percent of Workforce	
	2005-06	2016-17	2005-06	2016-17
Less than Bachelor’s	2,810	894	2%	1%
Bachelor’s	50,823	37,310	43%	38%
Master’s	62,270	58,400	53%	59%
Other*	2,070	1,877	2%	2%

* Includes Doctorate, J.D., M.D., and other credentials, licenses, and degrees.

Source: Center for Educational Performance and Information, REP

degree in ANY academic field. The majority of teachers today have a degree in education, and many have both a Bachelor's and a Master's in pedagogy."¹⁰

While it is clear that adequate knowledge of the subject being taught is necessary, teachers also need verbal and cognitive abilities and knowledge of how to teach the subject. Some may argue that teachers should be subject area experts, but few empirical studies link teachers' knowledge and student outcomes. One study that did investigate the effect of teachers' content knowledge and pedagogical content knowledge was performed in Germany, where math teacher candidates attend either an academic track or a non-academic track. Teachers on the academic track receive training comparable to a Master's degree in mathematics, while the non-academic track emphasizes pedagogy and offers only limited math courses. As expected, teachers on the academic track had higher content knowledge. This study found that "Pedagogical Content Knowledge (PCK)—the area relating specifically to the main activity of teachers, namely, communicating subject matter to students—makes the greatest contribution to explaining student progress. This knowledge cannot be

learned incidentally, but rather is acquired in structured learning environments."¹¹

Special Education In addition to highlighting the educational attainment of Michigan public school teachers, it is important to look at qualifications as they relate to special education. The state reports on school personnel by function (e.g., teachers, aides, administrators, etc.), but also differentiates general education from special education and career/technical teachers.

For the 2017-18 school year, there were 198,536 students with disabilities receiving special education services, 13.1 percent of all K-12 public school students enrolled. This share is largely unchanged from the share of students eligible for services in 2009-10 (see **Table 2**). The reduction in the overall size of the special education population is mirrored, more or less, in the teaching force assigned to work with these students. Based on this snapshot of special education workforce and students, the workforce has contracted at a fast pace than the decline in enrollment – the special education student-teacher ratio increased marginally over the period.

Table 2

Special Education Teachers and Students in Michigan, 2009-10 and 2017-18

	2009-10	2017-18	Percent of Total 2009-10	Percent of Total 2017-18
Special Education Teachers	12,843	11,060	14.8	13.8
Special Education Students	219,241	198,536	13.5	13.1
Student-Teacher Ratio	17.1	18.0		

Source: Center for Educational Performance and Information, REP

Trends in Teacher Demand

Education researcher Linda Darling-Hammond and her colleagues at the Learning Policy Institute frame the demand for teachers in two ways.¹² First, total demand represents the total number of educators needed in any given year to educate the state's public school students. This total includes those teachers that remain in the classroom from the prior year, plus all new qualified teachers needed to staff schools. Total demand is helpful to understand the overall size and makeup of the teacher workforce for a given period, but it is not nearly as relevant for discussions focused on school staffing demands and teacher shortages.

Instead, Darling-Hammond suggests that the focus should be on the demand for *new* teachers (a component of total demand). This is because the vast majority of teachers remain in the profession from one year to the next. Instead of total demand, researchers focus their attention on the annual change in teacher demand. Specifically, they look at the staffing needs required to fill vacant teaching positions arising from various factors, including changes in student enrollment, desired student-teacher ratios, and the number of teachers changing schools or exiting the profession. Because of Michigan's unique school funding program, the amount of school operating resources available each year is also an influential teacher demand factor as these funds are largely tied to a school's enrollment. Examining the short- and long-term trends surrounding these factors provides a sense of teacher demand from a statewide perspective.

According to Darling-Hammond's research, the role of each factor in teacher demand varies from year to year. The influence that any one factor contributes to demand will also vary. Factors can offset one another or they can combine to boost or suppress demand. The amount of push or pull any one factor, or combination of factors, plays in overall demand can be difficult to estimate for a given year.¹³

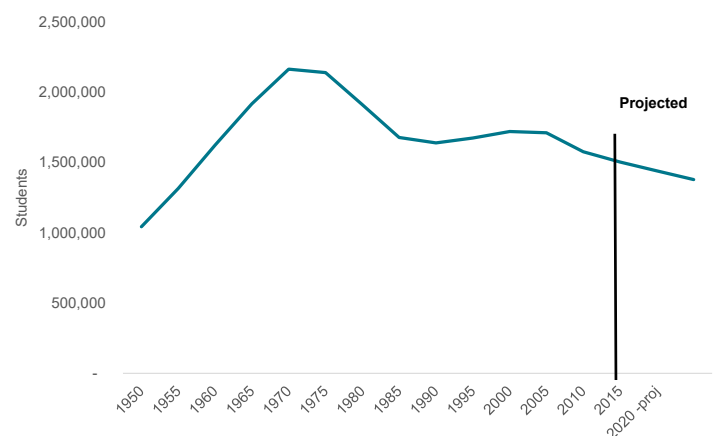
Student Enrollment

The number of students enrolled in Michigan public schools is the first, and most obvious, component of the teacher demand picture. Annual enrollment changes directly influence the number of teachers required to staff classrooms each year. Assuming student-teacher ratios are maintained, an increase or decrease in the school-age student population will result in changes in teacher demand in the same direction.

In 1950, just over one million students attended Michigan public schools. The Baby Boom doubled enrollment to just over 2.1 million students by the early 1970s. The overall trend over the past almost 50-year period has been a steady enrollment decline. A slight enrollment uptick occurred between the early 1990s and mid-2000s, largely attributable to the Baby Boom Echo and brief climb in birth rates. Today, total enrollment stands at just under 1.5 million students (see **Chart 8**).

Chart 8

Michigan Public K-12 Student Enrollment, 1950 – 2026 (selected years)



Source: Michigan Department of Education; National Center for Education Statistics

Enrollment projections from the National Center for Education Statistics show a continuation of the current trend as the number of public school students in Michigan is expected to slip to just above 1.4 million by the fall of 2027, an 8.2 percent drop since fall 2015.¹⁴ Michigan's projected student enrollment decline runs counter to the total U.S. enrollment projection which shows continuous growth through 2027 (total increase of 3.2 percent). Sixteen other states (including Great Lakes neighbors Indiana, Illinois, Ohio and Wisconsin) show enrollment declines in the federal long-term projections.

Birth rates explain some of the change in Michigan's public school enrollment over time. Again, the Baby Boom during the 1950s contributed to the rapid rise in enrollment. The Boomers registered the peak level of live births in 1957 (208,448 births), representing a rate of nearly 27 births per 100,000 women age 15-44. The

Michigan's projected student enrollment decline runs counter to the total U.S. enrollment projection which shows continuous growth through 2027.

state's overall population increased since the Baby Boom (from 7.8 million residents in 1960 to about 10 million today), but the number of births each year has declined significantly. In 2015, there were 113,211 live births in the state, a rate of 11 per 100,000 women age 15-44.

In addition to births, other factors have contributed to enrollment changes. For example, the shrinking number of students attending private schools has slowed the enrollment declines resulting from fewer births. In 1960, about 16 percent of students attended private schools compared to under 10 percent of students today.

To a lesser extent, public policy has contributed to the number of students enrolled in public schools. For example, Michigan has provided more opportunities for private school students to enroll in public schools. The shared-time instruction program allows nonpublic school students to enroll part-time in a public school to participate in elective, non-core classes. Local districts then claim state funding for providing educational

services.¹⁵ Although these students represent a small fraction of total enrollment, shared-time enrollment growth has been strong; from about 5,000 students in 2007 to over 11,300 in 2016.^k

The kindergarten start date is another example of how policy affects teacher demand. Over a number of years, Michigan law moved the start date from December 1 (for the 2012-13 school year) to September 1 (for 2015-16 and thereafter). In order for a district to enroll a student in kindergarten (and count the child in membership to claim state funding), the child must have attained age 5 by the cutoff date. During the phased-in implementation of this policy change, Michigan's total kindergarten enrollment shrank, reducing the demand for teachers.

Demand is also influenced by the characteristics of students attending public schools. Specifically, the changing number and relative shares of students requiring special education, economically disadvantaged students, and English language learners (ELL).^l These students often have additional educational needs and require supplemental resources. Specially trained teachers may be required to provide educational services to special education and ELL students, while disadvantaged students often require additional instructional supports to grow academically and succeed in the classroom. The State of Michigan allocates additional state resources to districts specifically for instructional programs (teachers and teaching aides) targeting "at-risk" and ELL students.^m

^k Growth in shared-time instruction was driven, in part, by changes in state law. Recently, the program was expanded to allow private school kindergarten students to enroll in public schools. Another policy change broadened the geographical boundaries of the program. Originally, public schools were only allowed to enroll private school students that resided within their district boundaries. Recent law changes allow districts to serve private schools in neighboring districts, including those located within the same county and neighboring counties.

^l "Economically disadvantaged" students include those eligible for free- or reduced-price lunch under the National School Lunch program, are in households receiving food stamp (SNAP) or cash (TANF) assistance, are eligible for Medicaid, are homeless, are migrant, or are in foster care.

^m These additional funds are provided via capped, earmarked state appropriations that are allocated on a per-pupil basis and separate from the funding supplied through the main per-pupil state aid formula. As the statewide population of students eligible for these additional funding streams increases, the per-pupil allocation each district receives decreases.

Compared to the continuous decline in overall student enrollment, the number of students identified as economically disadvantaged and the number of non-English speaking students have gone in a different direction. These student populations have increased in size and as a share of the total population. As **Chart 9** shows, the number of economically disadvantaged students enrolled increased about four percent; from 741,639 students in 2009-10 to 771,239 in 2017-18. Already a large segment of the overall population, the growth in this student cohort pushed the disadvantaged student share above the 50 percent threshold in 2017-18 from 45.7 percent in 2009-10. The share is far higher in many districts and charter schools. The additional resources from the state that charters and districts receive to fund supplemental services for “at-risk” students, creates a higher demand for some specially-trained teachers.ⁿ

Growth in the ELL subgroup over this nine-year period has been substantial; going from 58,916 students in 2009-10 to 97,838 in 2017-18. As a percent of the state-wide total, the ELL share increased from 3.6 percent to 6.4 percent. This growth can be linked to two primary sources. First, Michigan’s foreign-born population has grown at a much faster rate than its native-born popula-

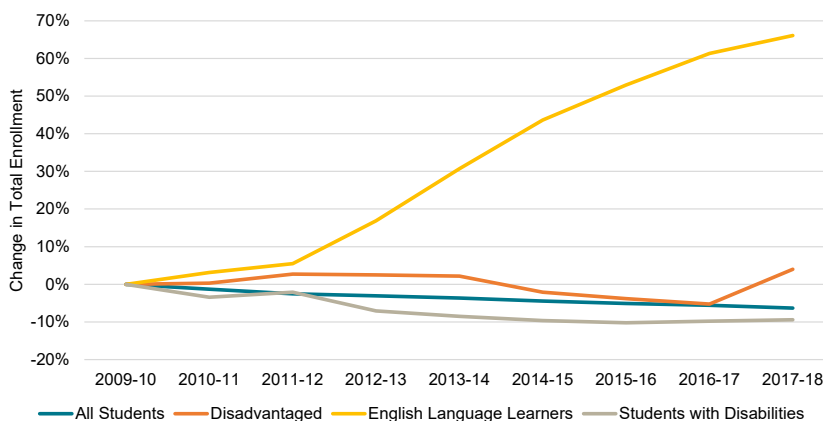
tion over the period 2000 to 2016.¹⁶ This is representative of a national trend where English learners have been shown to be one of the fastest growing student populations across the country.¹⁷ Another contributing factor is the increased emphasis the State of Michigan placed on identifying students in need of additional services under federal education law; in 2013 the state began using the WIDA assessment suite to identify K-12 students for English language proficiency.^o

Despite the explosive growth, the ELL population remains a small fraction of the total and much smaller than the share of economically disadvantaged students. Supplemental funding also is designated in the state budget to provide language assistance programs to help ensure that these students attain English proficiency and meet the same academic content and achievement standards that all students are expected to meet.

In contrast to the recent trends for these two subgroups, the number of students requiring special education services has experienced a small decline, more or less consistent with the overall public school enrollment trend. Over the nine-year timeframe, the number of students with special needs decreased from 219,241 students in 2009-10 to 198,536 students in 2017-18, maintaining a consistent 13 percent share of the total enrollment.

Chart 9

Enrollment Change by Student Group since 2009-10



Source: Center for Educational Performance and Information

ⁿ In recognition of the growing number of “at-risk” students and to slow the deterioration of the per-pupil funding allocation, the State School Aid Act increased funding from \$309 million in Fiscal Year 2015 to \$499 million in Fiscal Year 2018.

^o WIDA (World-Class Instructional Design and Assessment) is a consortium of state education departments across the country that designs and implements assessments proficiency standards and assessments for students learning English.

Private Schools and Their Role in the Teacher Pipeline

It must be acknowledged that this report focuses on Michigan's *public* K-12 educator workforce, including both traditional public and charter schools. As such, it intentionally excludes an entire sector of schools; *private* religious and nonreligious schools. Although relatively small compared to the public education sector in terms of the number of schools and student enrollment statewide, private schools affect the state's teacher pipeline in a number of ways that are highlighted here.ⁱ

As noted, school enrollment is a key determinant in teacher demand. According to state data for the 2016-17 school year, about 112,000 students enrolled in Michigan's 625 private schools. Private schools enrolled about 6.9 percent of the state's total school-age population of 1.62 million children. As with state's public schools, enrollment in private schools has been declining in recent years, but at a much more rapid pace. Total private school enrollment is down 9.0 percent since 2009-10 compared to a decline of 5.6 percent across all public schools. Given the private school enrollment trend, demand for private school teachers is declining.

While demand for classroom instructors is declining, private schools hire teachers from the same preparation programs as public schools. For the 2016-17 school year, Michigan's private schools employed 7,800 teachers; 81 percent held either a current state teaching certificate or a permit. While state law does not require state certification to work in a private school, teacher credentialing (e.g., certified, Bachelor's degree, etc.) is a common standard for third-party accreditation than many schools pursue. The vast majority of the private school workforce is opting to pursue State of Michigan certification, while another 17 percent hold a Bachelor's degree in lieu of a state-issued credential.

Private schools recruit from the same pool of new teacher supply as public schools. The declines in program enrollment and completers at the state's teacher preparation institutions (discussed later) means that private school hiring represents puts additional strain on Michigan's dwindling public school teacher supply from this primary source.

ⁱ The primary reason for excluding these schools relates to the availability and access to data. Private school information concerning school characteristics, finances, and performance is made available by various federal and state sources; however, in many instances the information is not exactly comparable to the information reported by public schools. Further, the public information about private schools is not nearly as detailed as that of public schools. For example, there are different methodologies for collecting student enrollment information across the two sectors. Much of the private school data is self-reported and not subject to state review or audit. This makes combining datasets for the two sectors problematic and the main reason for excluding private schools.

over time, the ratio provides perspective about how staffing levels change (e.g., supply of teachers), relative to changes in student enrollment (e.g., demand for teachers).

The ratio can be affected by a variety of factors, including the amount of financial resources available to a school or district to hire staff, a school's or district's grade configurations as different learning environments require different staffing levels (e.g., K-8, K-12, high school), student demographics and needs (e.g., share of students with added needs, students requiring special education services), as well as state or local

laws requiring certain class sizes. Collective bargaining agreements also may play a role if they stipulate maximum class sizes for certain educational settings, such as elementary or high school classrooms.

The student-teacher ratio is limited in terms of its explanatory power. The ratio, by itself, does not provide a clear benchmark of what is the adequate or desired staffing level. While the status quo or past ratios may be used as a benchmark, that does not mean they are representative of adequate staffing levels. Schools districts cannot control half of this equation – the number of students enrolled – so a push to lower the ratio will

require hiring additional teachers. Further, the overall ratio may mask staffing shortages in specific teaching settings. Staffing levels, especially in some teaching positions, may not be adequate if schools are adding teachers in other subject areas and driving ratios down.^p

The ratio can serve as a proxy for class size, but it is not synonymous with class size.¹⁸ Measures of class size directly look at teacher assignments in a specific classrooms or grouping of classrooms and remove the effect of non-classroom teachers, who, by being assigned to a very small number of students, artificially deflate the reported student-teacher ratio. Class size, is an important variable in the education production equation and often the subject of media and public attention. It is one of a handful of key variables thought to influence student learning and that can be controlled by public policy decisions (e.g., mandated or incentivized class-size reduction initiatives).¹⁹

Numerous studies demonstrate a causal link between smaller classroom sizes and higher academic achievement, especially in early education. Funded by the Tennessee Legislature in 1992, the Student/Teacher Achievement Ratio (STAR) Project comprehensively studied the academic outcomes of K-3 students assigned randomly to classes of different sizes. It found students in smaller classes, especially minority and inner-city students, performed better than students in larger classes; the beneficial effects last longer the more years students spend in smaller classes. Other contemporary state-mandated programs, such as Student Achievement Guarantee in Education in Wisconsin and Class Size Reduction in California, found similar benefits in small classroom sizes.

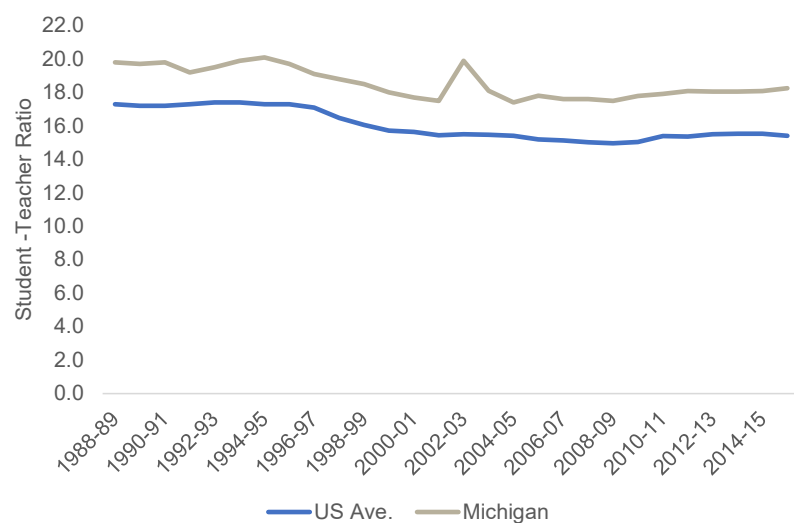
^p In terms of scale, the ratio is nearly always smaller than class size because it captures personnel working as specialists (e.g., teachers working intensively with a small group of students) that do not preside over a traditional classroom setting. Despite this key difference, the ratio and class size are highly correlated.

Michigan Trends Across all Michigan school districts in 2015-16, the reported average ratio of 18.25 students per teacher, compared to a U.S. average of 16.0 (the median state, Tennessee, had a ratio of 15.06). This means that the average Michigan public school teacher was responsible for about two more students than the average teacher across the country.^q California, consistently the state with the highest ratio, assigned nearly 27 students to each teacher.

Michigan's ratio consistently has been greater than the U.S. average since the late 1980s (see **Chart 10**). On average over this period, Michigan teachers were

Chart 10

Michigan and U.S. Student-Teacher Ratios, 1988-89 to 2014-15



* The federal data shows Michigan's ratio spike from 17.1 in 2001-02 to 19.9 in 2002-03 and then falls to 18.5 in 2003-04. Reasons behind this spike are not clear as staffing and enrollment data prepared by the State of Michigan does not support this abrupt change in trend.

Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Public Elementary/Secondary Education Survey"

^q Michigan's student-teacher ratio reported by the federal government looks much different than the ratio published by the State of Michigan. For the same year, the Michigan Department of Education, *Bulletin 1014 Michigan Public Schools Ranked by Select Financial Information* reports the student-teacher ratio as 23 to 1 (or 23). The primary reason for this discrepancy has to do with the fact that only "basic instruction" teachers are reported in the Bulletin 1014 publication and used to calculate the student-teacher ratio. The federal ratio is based on data submitted by the Michigan Department of Education and includes all teachers (e.g., general education, special education, career and technical instructors).

assigned about two and one-half additional students compared to the average teacher. Relative to the average state, Michigan has a lower overall demand for public school teachers based on its higher ratio.

Apart from consistently being larger than the U.S. average ratio, Michigan's ratio has tracked the national experience since the late 1980s. Generally, the trend has been a period of relative stability (late 1980s/early 1990s), followed by a period of consistent decline (until the Great Recession), and most recently, a period of gradual increase (post-recession). Since 2008-09, the U.S. and Michigan ratios have been slowly increasing as a result of a slowdown in teacher hiring associated with austere school budgets following the recession. During this period, Michigan's ratio increased from 17.52 in 2008-09 to 18.25 in 2015-16, while the U.S. ratio rose from 15.0 to 15.4.

A public push to return student-teacher ratios to pre-recessions levels in Michigan would increase the demand to hire additional teachers. It is estimated, based on the statewide student enrollment in 2015-16, that an additional 3,500 teachers statewide would be needed to reduce the student-teacher ratio from 18.25 to 17.52, Michigan's pre-recession ratio.

Teacher Turnover and Attrition

Each school year, many parents find out that their child's teacher is leaving for a job at another school or leaving the profession all together.^r On average, about 16 percent of public school teaching positions must be filled each year because of job changes or career exits.²⁰ If the teaching workforce shrinks because of departures, and student enrollment remains stable, classroom size is likely to increase. Efforts to maintain class size at the same time that teacher fill rates are increasing will drive up the demand for new teachers.

^r Teacher mobility, generally, refers to individuals that leave a particular school for another teaching position outside of that school. On the other hand, attrition involves departures or separations from the profession. These may be voluntary (retirement, personal reasons, etc.) or involuntary (firings, reductions in force, etc.).

Teachers leave their current school or the profession for any number of reasons, including retirements, district staffing decisions, personal reasons (e.g., teachers leave for medical/family reasons, job dissatisfaction), and professional reasons (e.g., move to another school, district, state for a different job). Research done by the Learning Policy Institute suggests that the most frequently cited reasons were dissatisfactions with the frequency of student testing and heightened accountability expectations; lack of administrative support; career dissatisfaction; and working conditions.²¹ These reasons suggest that the teaching profession is not necessarily different from any other profession.

Similar to all other occupations that experience employee turnover, departing teachers may be broken into two camps; "movers" are those who move to teaching positions in other schools and "leavers" are those who exit the profession altogether. Generally, year-over-year school departures are fairly evenly split between the two groups.

Relative to the average state, Michigan has a lower overall demand for public school teachers based on its higher student-teacher ratio.

According to the Learning Policy Institute, teacher attrition currently is projected at an annual rate of eight percent and is the largest driver of annual demand for

teachers across the U.S. Within the leaver group overall, retirements account for about one-third of the total in the U.S.²² About two-thirds of the total is attributable to other, non-retirement related reasons. While annual teacher retirements can be relatively predictable based on recent trends and the demographics of the current workforce (e.g., age of teachers, years of service, etc.), the factors driving pre-retirement teacher exits can be less predictable, such as job satisfaction, working conditions, family situations, or personal reasons.

Concerns about high turnover, especially for new teachers, has generated substantial debate. One oft-cited statistic about the profession is that about one-half of all new teachers leave within the first five years of entering the profession. In some circles, the "50 percent in five years" statistic is the driving force behind teacher vacancies and a key contributor to teacher shortage. However, this statistic is dated and subsequent research has shown it to be unreliable,

even according to the original researcher that came up with it.²³ More recent estimates show that about 83 percent of new teachers were still teaching after five years, suggesting an attrition rate of 17 percent over the first five years of entering the profession.²⁴ The report found a gradual increase in the percentage of exits; after year one 10 percent of teachers left, after two years 12 percent left, after three years 15 percent left, and after four years 15 percent left. The reality is that attrition among the teaching profession, not unlike other professions, can be an obstacle to staffing classrooms and the flow of teachers out of schools is not equally distributed across states, regions, and school districts.

Recently, the Michigan Department of Education issued analyses on various aspects of teacher turnover, including historical trends and comparing the state to the national experience. To conduct these analyses, researchers looked at teacher turnover data for the U.S. and Michigan for three separate years (2004-05, 2008-09, and 2012-13).²⁵ Nationally, it was shown that about 84 percent of teachers stay in the same school from one year to the next. Of the remainder, roughly eight percent change schools, either within or outside of their current district, and another eight percent leave the workforce in the subsequent year.^s For the general U.S. teacher population, these percentages were stable across all three years examined (see **Table 3**).^t

Some analyses of teacher labor markets contend that mobility does not reduce the supply of teachers because these individuals ultimately become new hires. In

Table 3
U.S. Public School Teacher Mobility and Attrition

	Teachers				Share of Total		
	Total	Stayers	Movers	Leavers	Stayers	Movers	Leavers
2004-05	3,214,900	2,684,200	261,100	269,600	83.5%	8.1%	8.4%
2008-09	3,380,300	2,854,900	255,700	269,800	84.5%	7.6%	8.0%
2012-13	3,377,900	2,846,500	271,900	259,400	84.3%	8.1%	7.7%

Source: Reproduced from 2017 Michigan Department of Education report, *Teacher Turnover in Michigan*

these cases, teacher migration is either de-emphasized or excluded entirely from the discussion of turnover. While this makes sense from a system-wide perspective, in the context of annual school staffing needs, this is basically a distinction without a difference. Individual schools face the same increase in demand regardless if a teacher moves to a neighboring district or leaves the profession. When the number of vacancies mount or positions become difficult to fill, shortages can develop.

Turnover in Michigan As education policymakers and school officials search for solutions to workforce challenges, it may be helpful to know whether the trends observed in Michigan mirror experiences elsewhere. Michigan’s experience with turnover has been fairly consistent over the immediate term; however, over a longer time frame, the state’s mobility and attrition rates have been creeping up. At about 20 percent for the most recent year, the state’s overall turnover rate is relatively high compared to the U.S. average of 16 percent.

For the same years analyzed, the state’s teacher turnover picture differs from national experience in two ways. The first key difference is the relative instability in the Michigan workforce. For 2012-13, the state’s turnover rate was 20 percent compared to 16 percent for the U.S. (see **Table 4** on page 19). This difference (just over four percentage points) means Michigan’s rate is nearly 25 percent higher than the national figure. Had Michigan been at the U.S. average, schools would have had to fill 3,800 fewer teaching positions in 2012-13. Michigan’s more recent experience (2016-17) shows that the turnover rate, although down a bit, has remained fairly constant at about 19 percent.

s If a teacher is employed in any public school one year, but not employed as a teacher the subsequent year then they are identified in these studies as “leavers.” “Leavers” may return to public school teaching in future years, but the data does not pick this up.

t For the teacher attrition analyses, researchers looked at teacher employment in a “base year” and the subsequent year. For example, researchers examined teacher employment status in 2012-13 (base year) and 2013-14. Results of the attrition analyses are reported for the “base year.”

The second observation is that in addition to the relative instability in the workforce compared to the U.S. overall, the state's turnover picture is worsening. This is clear from looking at Michigan's experience over the 12-year time frame in **Table 4**. The percentage of stayers in Michigan dropped from about 83 percent in 2004-05 to 80 percent in 2016-17.

experience is consistent with other states.²⁷ The pattern of higher teacher attrition rates in charter schools was evident regardless of the district locale (i.e., urban, suburban, rural), although the difference in turnover rates across school types was greatest in the urban setting. The spread in turnover rates was smallest in Michigan's rural districts. Charters had a stability rate

Table 4

Michigan Public School Teacher Mobility and Attrition

	Teachers				Share of Total		
	Total	Stayers	Movers	Leavers	Stayers	Movers	Leavers
2004-05	102,832	84,830	9,799	8,203	82.5%	9.5%	8.0%
2008-09	98,494	81,074	10,195	7,225	82.3%	10.4%	7.3%
2012-13	94,603	75,904	12,181	6,518	80.2%	12.9%	6.9%
2016-17	91,360	73,713	10,396	7,251	80.7%	11.4%	7.9%

Source: Reproduced from 2017 Michigan Department of Education report, *Teacher Turnover in Michigan*

Importantly, the Michigan data also provides insight into the cohort of teachers driving the uptick in turnover over time. The percentage of leavers was revealed to remain fairly stable at around eight percent over this period, consistent with the national benchmark. In contrast, the cohort of movers are chiefly responsible for the growing workforce instability; the share of the workforce that moved from one school to another increased from 9.5 percent in 2004-05 to 11.4 percent in 2016-17, more than 50 percent greater than the national figure (8.1 percent).

Another Michigan Department of Education research brief that examined workforce stability based on school setting (i.e., urban, suburban, rural) and school governance models (i.e., traditional public schools/charter schools) found that the teaching workforce was most stable in suburban districts (15 percent turnover rate) and least stable in urban districts (24 percent turnover).²⁶ Statewide, the average turnover rate was 18 percent.^u

Variation also exists across school governance models. For the 2016-17 year, teacher turnover was much higher in charter schools statewide (30 percent) than in traditional public schools (14 percent). Michigan's

of 63 percent compared to 80 percent in traditional urban districts. This means that more than one-third of urban charter school teachers move to another school or leave the profession each year. The vast majority of Michigan's charter schools are located in urban centers of the state.

Regional patterns also show up in the teacher turnover rates. Differences are seen across the state's 10 prosperity regions with schools in the Detroit Metro and Southwest regions exhibiting the highest average turnover rates at 20 percent and 18 percent, respectively.^v The West Michigan Prosperity Region showed the greatest stability in its teaching workforce with a turnover rate of 15 percent. Also of note, the variation in turnover rates between traditional and charter schools was present across the regions. Of particular note, charter schools in Detroit Metro had an average turnover rate of 36 percent, more than double what it was for the traditional public schools in the region. Of course, this region has a very high concentration of charter schools and teachers.

In summary, Michigan's teacher workforce is relatively instable compared to public schools across the country. The higher turnover rate is driven primarily by teach-

^u For this analysis, three-year average rates were calculated using data from 2014-15, 2015-16, and 2016-17, in order to smooth out any unusual annual spikes in the data.

^v https://www.michigan.gov/dtmb/0,5552,7-358-82547_56345_66155---,00.html

ers moving from one school to another as opposed to teachers leaving the workforce. Not surprisingly, individual district attrition rates vary with urban districts, generally, showing much greater teacher turnover. Also, there is less teacher stability in charter schools across Michigan, regardless of the setting. The main takeaway is that Michigan's higher turnover rates overall, as well as the higher rates observed in certain types of schools (e.g., urban and charter) and in specific parts of the state, means that schools in the state are more likely to be dealing with teacher vacancies than those across the country and therefore boosting demand.

The Causes of Michigan's Teacher Turnover

The reasons cited by teachers that leave the profession differ from the reasons cited for moving from one school to another, although there is some overlap in the responses given. In both cases, the most frequently cited reason relates to dissatisfaction, specifically with the amount and timing of student testing and accountability pressures; lack of administrative support; the teaching career generally and the lack of opportunities for advancement; and working conditions.²⁸ It is likely that, to varying degrees, all of these factors contribute to Michigan's mobility and attrition rates. However, the gap between Michigan's turnover rate and the U.S. average suggests the possibility that state-specific dynamics may be at work. Some observers have wondered what role federal and state education policies, specifically those affecting the educator profession, have played in changes in teacher labor markets.

Since President George W. Bush's major education initiative No Child Left Behind (NCLB), there has been an effort by states to introduce greater accountability in schools and classrooms. NCLB expanded test-based school accountability policies and established more rigorous teacher licensure standards. In 2009, building on some NCLB-related policies, the Obama administration continued the push to improve teacher quality. In contrast to the NCLB mandates, the Obama administration's approach relied on financial incentives. The 2009 Race to the Top grant competition was used to

encourage states to adopt reforms to the public teaching profession and labor market. The general thinking behind the federal reforms was to identify and remove ineffective teachers in order to improve teacher quality and drive improvements in student achievement.

Nearly every state vied for a piece of the nearly \$4.4 billion in federal Race to the Top money. Michigan included a new teacher evaluation system along with a host of other reforms in its bid. Although the state was not selected, state policymakers embraced the teacher-related reform mindset. At the urging of newly-elected Governor Snyder, state lawmakers enacted a

sweeping and comprehensive suite of teacher labor reforms in 2011. The package of new laws reduced teacher tenure protections, implemented a new teacher evaluation system based on student outcomes, and made changes to collective bargaining. On top of these education-specific reforms,

the state adopted a Right-to-Work law in the fall of 2012, further curbing the financial resource base and political power of teacher unions. Many opponents of the reforms have referred to the combination of major policy changes as Michigan's "war on teachers," arguing that they would drive current and prospective teachers from the profession and contribute to teacher shortages.²⁹

Researchers at Michigan State University's Education Policy Innovation Collaborative examined these reforms in order to determine if they had any effect on teacher attrition and whether they contributed to the state's rise in turnover rates since the mid-2000s.³⁰ The study confirmed that, although attrition rates varied for teachers with different years of experience, exit rates for each individual group had been relatively stable before the Michigan reforms were enacted in 2010.

The study concludes that following reform adoption in 2011, the attrition rates increased substantially by about one percentage point per year (through 2013). While these increases coincided with the adoption and implementation of the reforms to teacher performance and evaluation along with collective bargain-

Not surprisingly, individual district attrition rates vary with urban districts, generally, showing much greater teacher turnover. Also, there is less teacher stability in charter schools.

ing changes, the study concludes “although teachers have been exiting Michigan schools at higher rates, the teacher-specific reforms had no particular impact on teacher exits apart from whatever forces were affecting employees in public schools more generally... our results cast doubt on claims made by opponents of high-stakes teacher evaluation systems and other recent reforms that such reforms would lead to a mass exodus of teachers.”

The researchers were able to identify an important exception to their general finding regarding Michigan’s “war on teachers.” The reforms were found to be strongly associated with an increase in teacher exits from predominately poorer, hard-to-staff school districts (primarily those with high concentrations of disadvantaged students and high dropout rates), compared to wealthier districts. These schools already have difficulties with staffing and Michigan teacher employment policies have added to the challenge.

The Michigan State University research focuses on the effects of new teacher evaluation and tenure reforms on *existing* teachers (i.e., attrition rates). Another recent study looks at how these types of reforms impact the supply of *new* teaching candidates available to public schools.³¹ This work looks specifically at how states’ adoption of high-stakes evaluation systems and eliminating tenure protections reduces the number of teacher preparation program graduates, as has been Michigan’s experience. The study found that changes to teacher evaluation systems caused a gradual decline in new teacher supply. Thus, while Michigan’s “war on teachers” may not have influenced most current teachers to abandon the profession, there is evidence that certain teacher-related policies discourage potential entrants into the profession by providing a strong signal about working conditions (tenure), as well as work expectations and desired results (student performance).

Drawing broadly from the state-specific research, Michigan’s recent teacher accountability and tenure reforms may have had different effects on the teacher pipeline. On the demand-side, reforms appear to have

had little effect on general teacher attrition rates. However, over on the supply side, the adoption of a high-stakes evaluation system may be a contributing factor in Michigan’s declining teacher supply as individuals shy away from pursuing degrees in education.

Importance of Teacher Retention In addition to raising teacher demand and contributing to vacancies, higher turnover rates can be costly for schools and students. While some turnover is expected and can be beneficial, increased rates require districts to spend additional funds recruiting, on-boarding, and training new staff more frequently. These expenses have to be covered from funds that would otherwise go towards classroom instruction or other school services. The financial costs vary depending on a host of factors with estimates ranging from \$4,000 to \$18,000 per teaching position needing to be filled.³² For difficult-to-staff urban districts, filling a single vacant teacher position can approach \$20,000.³³

The reforms were found to be strongly associated with an increase in teacher exits from predominately poorer, hard-to-staff school districts.

Apart from the financial costs involved, student learning and achievement also suffer. Research has shown higher turnover rates have deleterious effects on academic performance

for students, not only those directly affected by teacher vacancy but also students in other classrooms.³⁴ The problems are compounded when high rates of turnover occur in hard-to-staff schools as the personnel churn creates a steady flow of inexperienced teachers in classrooms, along with overall school instability, where students are already struggling to succeed academically.

High teacher turnover can disrupt a school’s ability to develop and maintain its social capital.^w Study shows that turnover stymies the kind of continuity required to build and establish relationships among teachers, students, and families. Such relationships develop over time and are critical for forming a sense of community unified by a common mission and an agreed-upon strategy for achieving it. These strong relationships

^w Social capital refers to the intangible resources embedded within interpersonal relationships or social institutions.

allow schools to establish norms for instructional quality, professional conduct, student behavior, and parental involvement—all of which are linked to student achievement—especially for financially impoverished students.³⁵

Michigan's teacher turnover rate is high and likely a key contributor of reported teacher shortages in many schools. While state policymakers and local school officials are often tempted to concentrate on shortage strategies aimed solely at teacher recruitment, teacher retention strategies can be just as promising. Curbing turnover, regardless if it originates from teacher mobility or attrition, reduces the costly and often disruptive process of having to fill classroom vacancies. At the same time, reducing the annual classroom churn eases the pressures on the teacher pipeline that are associated with a shrinking supply of teaching candidates coming out the state's teacher preparation programs. In this sense, retention strategies can serve as a "twofer" in that they address both sides of the teacher labor market.

Retaining teachers with all levels of classroom experience is a challenge, but it is particularly problematic for those just starting out in the profession. Higher rates of turnover are associated with teachers during their first five years on the job. As noted earlier, national attrition rates during this period are upwards of 17 percent and Michigan's teacher turnover rate has been higher than the national average for some time. But, it also must be recognized that losing experienced teachers creates challenges. Teachers improve most rapidly during their early years on the job, similar to what occurs in most professions. Experienced teachers are also important to student achievement gains despite some misconceptions that teachers don't improve after their first few years in front of a classroom. The oft-cited teacher "performance plateau" has been debunked by research showing that teacher performance (as measured by student standardized test scores) continues to improve beyond the first five years, although variation exists across teachers with school organizational factors playing a critical role in this variation.³⁶

Michigan's teacher turnover rate has been higher than the national average for some time.

Funding

Another factor in the teacher demand puzzle is the amount of financial resources available to Michigan schools each year. Additional operating funding can be used, among other purposes, to increase the compensation of existing teachers or hire additional teachers to reduce class sizes. Conversely, fewer resources can result in hiring freezes or staffing cutbacks. Michigan's unique school finance system accentuates the role that funding plays in teacher demand primarily because of the way operating resources are allocated (per-pupil basis) and the unusually large role played by state officials in determining local school funding levels.

Unlike other states where school districts play a major role in setting school budgets through reliance on local property taxes, Michigan's school finance system is heavily centralized at the state-level. This is the case for purposes of raising revenue to fund schools (e.g., specific taxes authorized) as well as determining the amount of funding schools will have to operate schools. As a result of 1994's Proposal A school finance reforms, the majority of school operating funding is supplied through state-levied taxes provided to districts via a state revenue sharing program (i.e., per-pupil foundation grant). Annual changes to the amount of the per-pupil foundation grant are largely tied to the amount of state taxes and fees collected and deposited in the nearly \$13 billion School Aid Fund. Generally, additional School Aid Fund dollars enable increases to the per-pupil grant. Additional state funds also may be provided for specific student groups (e.g., at-risk) and/or districts, but these resources play a much smaller role in the overall operating budgets of schools. Schools also receive federal and local funds to support their operations.

In nominal dollars, total state funding for K-12 education, which is comprised predominantly of the School Aid Fund dollars, is up by more than \$5.0 billion since the adoption of Proposal A; from just under \$8 billion in FY1995 to about \$13 billion in FY2018. Adjusting these raw numbers for changes in student enrollment and inflation, as measured by the consumer price index, provides a better measure to compare student-level resources over time.

Chart 11 illustrates the general picture of inflation-adjusted per-pupil state funding for K-12 public education since adoption of Proposal A. The clear ebb and flow seen during the early-2000s and again in the late-2000s is largely a response to the recession of the early 2000s and the Great Recession later in the decade. The economic downturns slowed the growth of revenues flowing into the School Aid Fund and thus state funding available for distribution to public schools. Since the Great

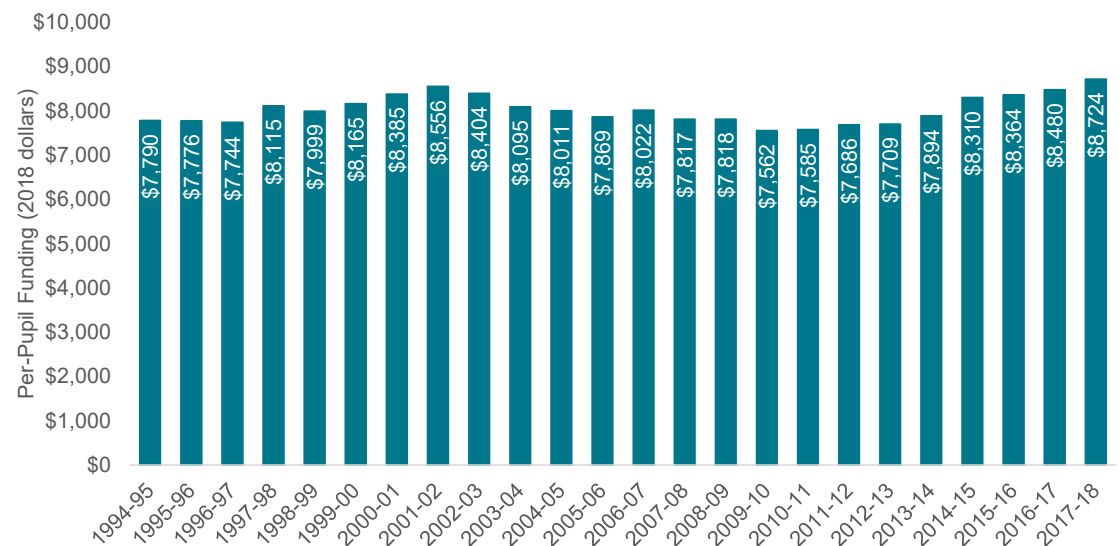
Recession, the aggregate amount of state funding has been on the rise. This has accounted for the observed per-pupil funding increases above inflation, although declining enrollments have also aided this growth to a lesser extent (a shrinking student population base allows for increases in state per-pupil funding assuming total revenue is not declining).

While Michigan has experienced slow and steady economic growth since the start of the current expansion, the state budget has benefited from increased tax collections. The state's two main discretionary accounts, General Fund and School Aid Fund, are up from \$18.5 billion in Fiscal Year 2010 to \$24.2 billion in Fiscal Year 2018. Looking forward, based on current state and national economic projections, the state's long-term revenue picture shows further modest growth in the combined accounts through Fiscal Year 2023.³⁷

Michigan budget writers have dedicated some of these additional resources to public education. With fewer public school students each year, per-pupil funding has increased at a faster clip than the increase in state resources following the Great Recession. Per-pupil revenue growth has exceeded inflation since. The availability of additional financial resources provides school districts with the option of adding staff or directing resources to other school needs, creating additional teacher demand.

Chart 11

Real Per-Pupil State Funding Under Proposal A (2018 dollars)



Source: Senate Fiscal Agency; CRC calculations

Summary: Teacher Demand

Examining the main factors affecting the demand for K-12 teachers in Michigan reveals a mixed bag. Based on current trends in student enrollment, shifts in student-teacher ratios, growing and higher-than-average teacher turnover and attrition rates, and state funding levels for K-12 schools, teacher demand is subject to a push-and-pull. Some factors are boosting demand while others are suppressing it. Highlights from our analysis of the major demand factors show:

- The number of K-12 students in Michigan has declined steadily over the past 10 years; statewide public school enrollment fell from just over 1.7 million students in fall 2005 to a bit more than 1.5 million students in fall 2015, roughly a 12 percent decline. This can be largely attributed to the state's population loss during this period. Accompanying the enrollment decline, the state's teaching force shrank 16 percent, from almost 118,000 teachers to just over 99,100 teachers over this period.
- Enrollment projections from the National Center for Education Statistics show further reductions as the number of Michigan students slips to just over 1.4 million by the fall of 2027, an 8.2 percent drop compared to fall 2015. Absent other forces, this decline would be expected to suppress teacher demand going forward.

- Compared to the steady decline in overall enrollment, there has been an increase in the number of students identified as economically disadvantaged and the number of non-English speaking students, while the number of students requiring special education services has fallen with the overall decline. Generally speaking, these student populations require additional instructional supports and resources; demand for specially-trained teachers has risen, a trend likely to continue.
- Michigan school teachers are responsible for about two more students than the average teacher across the country. The statewide student-teacher ratio has been higher than the U.S. average figure for some time. The state's pre-Great Recession ratio of 17.52 students per teacher in 2008-09 increased steadily to 18.25 in 2015-16 with the tightening of budgets and hiring pauses caused by economic downturn. A public push to return to the pre-recession ratio would add 3,500 teachers to the workforce.
- A Michigan Department of Education report found that average teacher turnover among the state's public schools was 19.8 percent between 2012-13 and 2013-14 – a rate significantly higher than national average of 15.7 percent. Further, there is little indication of any adjustment in turnover in the near future as Michigan's overall rate hardly fell in 2016-17 (19.3 percent). Michigan's steady high-than-average teacher turnover rate plays a role in boosting teacher demand.
- Another state report highlighted the considerable variation in teacher turnover rates across districts by locale (e.g., urban, suburban, etc.) and by school governance structure (i.e., traditional compared to charter public). It showed that urban districts, generally, had the highest teacher turnover (24.3 percent), followed by rural (16.1 percent) and suburban (15.4 percent). Also, it was shown that charter schools had less teacher stability (i.e., higher turnover) than traditional public schools, regardless of the setting (e.g. urban, suburban, etc.). The largest spread in turnover rates was in urban setting; traditional public schools averaged 20.1 percent compared to 37.3 percent in the charter sector.
- Research into Michigan teacher turnover rates shows that the state-level educator reforms implemented in 2010 through 2012 are not to blame for the overall increase in rates observed in the early part of the decade. However, there is evidence that these policies were associated with higher teacher exit rates in hard-to-staff schools (i.e., schools with high concentrations of low-income students, poor academic performance, and high dropout rates).
- A final demand factor is funding – Michigan school districts receive the bulk of their operating funds from state sources. Following years of annual declines in inflation-adjusted per-pupil funding beginning in 2001-02, schools, on average, have seen modest growth in per-pupil state resources since 2011-12. The availability of additional state funds provides school districts with the option of adding staff or directing resources to other school needs, creating additional teacher demand.

Trends in Teacher Supply

There are a number of ways to think about the supply component of the state's teacher labor market. Researchers suggest that one way is to think about the total number of teachers needed to staff classrooms in a given year; for Michigan, this approximates 100,000 teachers today, a number that has been steadily falling for many years. However, as was pointed out in the discussion about teacher turnover, the vast majority of the state's teachers remain in the workforce from one year to the next. As such, this component of total supply can be removed from the equation, leaving just the pool of teachers that will be available to fill vacancies that occur over the course of a year. This includes either new entrants or re-entrants to the workforce – individuals who previously worked in a classroom, are currently credentialed, and are seeking to re-enter. Here we examine the trends affecting the state's primary supply of new entrants and those looking to re-enter the teaching force, both in-state and from outside of Michigan.

...from 2008-09 to 2015-16, the number of students enrolled [in teacher preparation programs] has declined about 66 percent.

Paths to the Teaching Profession in Michigan

Michigan classrooms are staffed by individuals that have arrived at teaching via a number of different pathways. Individuals can gain their required training through traditional teacher preparation programs as well as alternative preparation programs. Vacant teaching positions can be filled with qualified candidates trained in other states that come to Michigan to teach. Also, vacant teaching positions can be filled by individuals that previously taught, left the workforce for any number of reasons, and re-enter the profession. Schools also fill vacant positions with substitute teachers, often these are individuals looking to move from part-time to full-time employment in the field. Finally, some teachers jump from a private school setting to public schools.

New Teacher Production Historically, the vast majority of classroom instructors were trained at one of the state's 38 teacher preparation programs (formally

education preparation institutions (EPIs)).^x Reports of teacher shortages often cite as evidence enrollment and completion data for teacher preparation programs. It is important to note that Michigan institutions have long graduated more first-time teachers than are hired by the state's elementary and secondary schools. The fact that there might be a decline in program enrollment is not, by itself, a cause for alarm. Given previous years of overproduction, an enrollment decline may represent a labor market correction. Under this scenario, high school students considering teaching as a career see the employment situation facing recent graduates and chose to pursue another course of study.

The most recent federal Title II data for student enrollment and degree completers at Michigan programs shows that there are fewer potential teachers coming out of training programs (see **Chart 12**).^y For the eight-year period from 2008-09 to 2015-16, the number of students enrolled has declined sharply

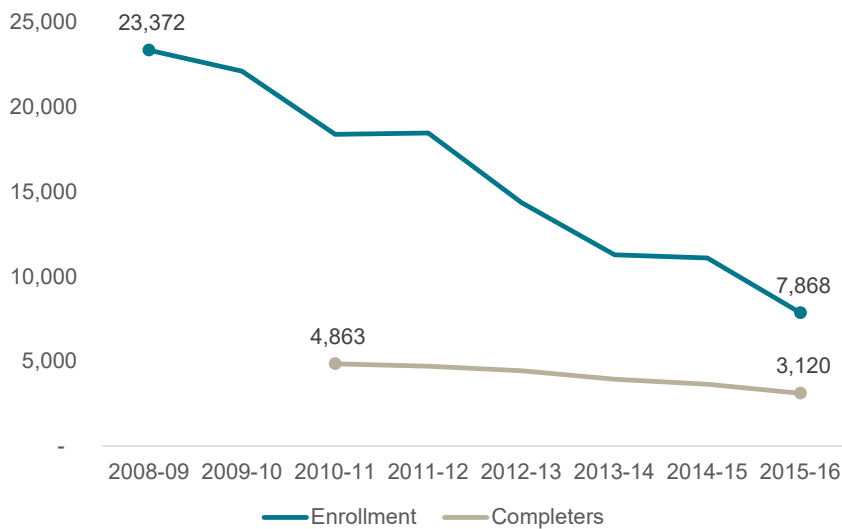
from 23,372 students to 7,868 students, or about 66 percent. This drop follows a broader trend in Michigan postsecondary education enrollment over the period, but to a much greater extent. Total enrollment at all four-year and two-year public and private postsecondary institutions fell by just 8.1 percent over the same period (from 652,799 students to 600,203 students), just a fraction of the decline seen in teacher preparation enrollments.³⁸

x The U.S. Department of Education annually reports statistics for teacher preparation programs in each state. For the 2017 report covering the 2015-16 academic year, there were 38 programs in Michigan; 33 traditional programs (housed within higher education institutions), four alternative route programs housed within higher education institutions, and one alternative route program that is not affiliated with a higher education institution. Aggregate Michigan data from the on-line report is used to highlight enrollment and completion numbers. See: <https://title2.ed.gov/Public/Home.aspx>

y The federal Title II reports contain considerable information about Michigan teacher preparation programs. Because of the time required to produce the reports, the data can be a few years old.

Chart 12

Enrollment and Completers at Michigan Teacher Preparation Programs



Source: U.S. Department of Education, Title II Higher Education Act Report Card

This means a shrinking share of the state's college students are preparing to become teachers, reducing a major source of supply for the state's future workforce. According to an ACT report, the number of high school students interested in an education major dropped to its lowest level on record in 2015 as the percent of all ACT-tested graduates planning to pursue education dropped 16 percent from 2011 to 2015.³⁹

Several factors may be at work here, including signals and messages that current teachers are providing to future teachers that the profession is one of low-prestige, low pay, low morale, and high stress. Given that enrollments had been trending down for some time, it is difficult to say what role, if any, Michigan's "anti-teacher" or "anti-union" reforms played in the declines of recent years. Did the reforms enacted in 2010 through 2012 serve as a signal to high school graduates considering careers in education, dissuading them from enrolling in teacher preparation programs? Among other things, the reforms impacted working conditions in public schools in a variety of ways, including criteria used for teacher tenure, layoffs, and performance evaluation. Additionally, the state passed a "right-to-work" law, weakening collective bargaining power of teacher unions. Many of these changes could be interpreted as making teaching a less desirable, and lucrative, profession. It is not clear that policy reforms had any affect at all on the long-term enrollment trend.

Michigan's enrollment experience is consistent with the national trend over a similar timeframe. According to the U.S. Department of Education, total enrollment in teacher preparation institutions is down 30 percent between 2008-09 and 2013-14.⁴⁰ To put the decline in national education program enrollments in context, overall postsecondary enrollment declined just three percent over this period. Thus, enrollment in teacher preparation programs fell by ten times the enrollment decline across all of higher education, again demonstrating that fewer high school students are pursuing teaching degrees at the post-secondary level.

Enrollment numbers in Michigan teacher preparation programs track all individuals enrolled regardless of an individual's year of study or time until completion. While this information provides one look at the pool of future teachers, students often change majors during their time in college or stop short of completing a teaching degree. Given this, it is also instructive to look at the number of program completers, as it represents a point further down the teacher pipeline and provides a clearer picture of future supply numbers.^z

Similar to the enrollment figures, the number of program completers is down considerably. Because the federal Title II completer information is not available before the 2010-11 year, we are only able to track data for a six-year period. Still, the decline in completers is noticeable, just not as drastic as the enrollment picture. Over the 2010-11 to 2015-16 period, completions fell 30 percent with just over 3,100 individuals having completed their program requirements in the most recent year (see **Chart 12**).

A full explanation behind the declines in enrollment and completions are outside the scope of this discussion. However, it is worth noting that four programs were

^z A program "completer" is defined as a person who has met all the requirements of a state-approved teacher preparation program. Documentation may take the form of a degree, institutional certificate, program credential, transcript or other written proof of having met the program's requirements.

eliminated since 2005, largely because of low enrollment and quality issues. At the same time, the State Board of Education has maintained a moratorium on new EPIs opening in the state since 2005 over concerns about a perceived over-supply of teachers and with the hopes of improving the quality of the existing programs.

Alternative Certification Programs In addition to traditional preparation programs, teachers enter the profession via alternative certification routes. Unlike traditional preparation programs housed in four-year colleges, alternative programs are fairly new. The vast majority of students preparing for the initial teacher license do so in a traditional program that culminates in a bachelor's degree. In contrast, alternative programs allow those with a college degree, often in a non-education field, to prepare for teaching licensure via a combination of training and on-the-job experience.

Over 500,000 of the 3.1 million teachers in the U.S. have entered teaching through routes other than traditional teacher training institutions. Nationally, about a third of teachers hired since 2005 entered teaching through an alternative program. Various goals have been promoted to support development of alternative routes to teacher certification:

- Expanding the pool of minority and underrepresented teacher candidates to promote diversity of culture and gender.
- Reducing the number of uncertified teachers employed.
- Recruiting individuals with significant academic and occupational experience to teaching.
- Facilitating the outplacement of individuals with substantial and proven experience in a given field.
- Expanding the pool of math, science, foreign language, or other specialty teachers available to work in rural and poor urban districts.

Across the U.S., a total of 28,846 individuals completed alternative teacher preparation programs compared to 163,613 completing via traditional routes in 2012-13; 15 percent of all of the people who completed teacher

training in that year followed alternative routes.⁴¹

Nearly all alternative routes to teacher certification are collaborations among the state licensing authority, institutions of higher learning, and local school districts. One example, Teach for America, places recent college graduates in urban and rural public schools through alternative certification programs. A 2011 survey completed by 1,076 teachers in the U.S. found striking differences in attitudes between teachers from nontraditional routes and graduates of traditional teacher education programs on school reform issues including tenure, performance pay, and using student achievement to evaluate teacher effectiveness.⁴²

Alternative certification programs were authorized as part of Michigan's 2009 Race to the Top school reform package. Among other purposes, the package was enacted in hopes of securing

Nationally, about a third of teachers hired since 2005 entered teaching through an alternative program.

a portion of over \$4 billion in federal competitive grant funding made available during the Obama administration. Michigan enacted a

new law to require the State Superintendent to approve a process for individuals to earn an *interim* teaching certificate through approved alternative programs. This credential allows an individual to teach full-time in public schools while he or she works towards earning a *standard* teaching certificate (i.e., credential earned by those who train in a traditional program).

Michigan's Alternative Route to Teacher Certification is a non-traditional program that allows a person to be granted this credential if he or she meets specific criteria; an individual must be enrolled in a state-approved alternative teaching preparation program, have a minimum of a bachelor's degree with a minimum 3.0 GPA as part of their cohort^{aa}, and pass the appropriate subject area Michigan Test for Teacher Certification in which they intend to teach.

^{aa} Recently, state law was changed to eliminate the requirement that an individual has a 3.0 GPA to enroll in an alternate route to teacher certification program. Instead, a person can be enrolled in a program and granted an interim teaching certificate if they are part of a program "cohort" that has a 3.0 GPA. Cohort is defined as all participants enrolled in a state-approved alternative route program for the three years prior to an individual entering the program.

The interim teaching certificate is valid for five years and cannot be renewed. Also, it cannot be issued for teaching in vocational, early education, or special education settings. In order to move from an interim to a standard teaching certificate, a teacher must complete the entire alternate route program they are enrolled in, taught successfully for three years, and be recommended by their program. Unlike a traditional program, a student teaching experience is not required; alternative route participants work full-time as teachers while attending their preparation programs.

Enrollment in Michigan-approved alternative teacher certification programs represents only a small fraction of the total enrollment in Michigan teacher education programs. For the 2015-16 year, a total of 95 individuals were enrolled in alternative teacher preparation programs, a little over one percent of the 7,868 students enrolled in all preparation programs (traditional and alternative). While the state has maintained a moratorium on new traditional programs since 2005, the number of alternative programs has grown since they were authorized under state law in 2009.

The first alternative route program authorized by the Department of Education was the University of Michigan M-ARC, which is affiliated with Teacher for America. Since, the Department has approved six additional programs, many operating within existing higher education institutions but separate from the traditional educator training programs.^{ab} All but two of these programs are operated by non-profit entities. In 2017, the state approved the first for-profit alternative certification program (Teachers of Tomorrow), followed by a second for-profit operator in 2018.

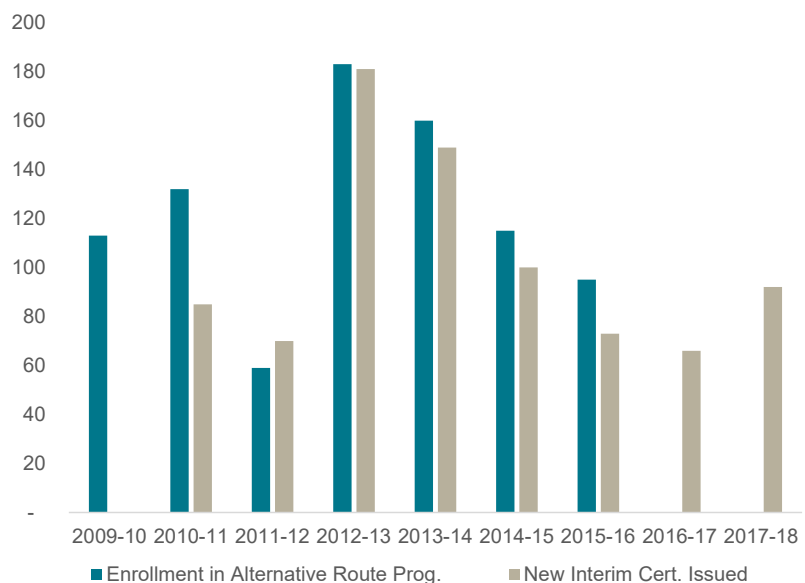
The number of newly certified teachers issued the interim certificate has

ebbed and flowed since the credential was first offered in 2010.^{ac} For the current year (2018-19), 169 certificates were issued by the Michigan Department of Education, nearly matching the peak number issued in 2012-13 (181 certificates). After declining between 2012-13 and 2016-17, the number of credentials issued has rebounded. The up-and-down production of this teaching credential is likely the result of opening of new programs (see **Chart 13**).

In terms of supplying the statewide workforce, Michigan's alternative programs are not a significant source of teachers. For the most recent year (2017-18), only 231 educators working in Michigan public schools (out of a total of nearly 100,000 teachers) had an interim teaching certificate.⁴³ A recent analysis found that teachers with alternative certification are concentrated in Detroit, mostly staffing charter schools (as opposed to traditional public schools), and assigned to a handful of schools that heavily rely upon these teachers to staff classrooms.⁴⁴

Chart 13

Enrollment in Alternative Route Programs and Interim Certificates Issued



Note: Enrollment data from U.S. Department of Education is only available through 2015-16.

Source: Michigan Department of Education; U.S. Department of Education

ab #T.E.A.C.H., Davenport University, Michigan Teachers of Tomorrow, Professional Innovators in Teaching, Schoolcraft College, University of Michigan M-ARC (Ann Arbor), and University of Michigan – Flint, see: <https://mdoe.state.mi.us/proprep/#!/providers>

ac Again, this represents the number of certificates issued not the number of individuals working as a teacher with this credential.

As more teachers acquired the interim teacher certificate, the number of teachers actually working in the classroom with the credential increased. In 2010-11, just 77 teachers with the credential worked in Michigan classrooms, but by 2014-15, this had increased to 429 teachers. Since, the number of these teachers has declined along with the slowdown in the issuance of the new certificates.^{ad} Throughout the short history of this credential, the number of teachers with it and assigned to a classroom has been a very small percentage of all teachers in Michigan.

Alternative certification pathways are a popular route into the teaching profession for minority teachers that can help improve workforce diversity. According to national statistics, black and Hispanic educators are twice as likely as white teachers to be trained via an alternative pathway.⁴⁵ This is not surprising given the escalating cost of higher education and the growing college debt burden many students face after receiving degrees.

Rising tuition and student loan obligations associated with traditional teacher preparation programs can dissuade students of color from considering teaching as a profession, especially if light of the possibility of working in a low-paying profession after graduation.

New Teachers by Subject Area As noted, enrollment across all Michigan teacher preparation programs is down nearly two-thirds since 2008-09. Similarly, the number of program completers has fallen dramatically. The degree of decline, however, has varied across individual institutions as well as the number of teachers prepared in each subject area.

Of Michigan's 38 teacher preparation programs, five institutions accounted for almost 50 percent of the total teacher production in 2015-16.^{ae} Collectively, these

institutions produced 30 percent fewer graduates in 2015-16 compared to 2011-12. This is somewhat lower than the reduction across all programs over the period (39 percent). While each of these major suppliers produced fewer graduates over this five-year period, the declines were not uniform. Michigan State University, consistently the largest producer of future teachers, saw a 6 percent decline in their number of graduates while Western Michigan University prepared 43 percent fewer graduates over the period.

Likewise, the declines in graduates have not been uniform across all subject area specializations. **Table 5** (see page 30) compares program graduates of all Michigan institutions in the 10 most popular subject areas in 2015-16 with the same areas for 2011-12.

Nationally, black and Hispanic educators are twice as likely as white teachers to be trained via an alternative pathway.

Across all subjects combined, the number of graduates is down 39 percent over the five-year period. While the number of teachers prepared in each grouping

is down, some areas saw larger drops than others. For example, the number of graduates trained to teach English, secondary education, social studies and history dropped by more than the 39 percent overall decline.^{af} Because of these larger declines, these groupings' respective shares of the total also shrank.

On the other hand, the number of graduates prepared to teach at the elementary and early childhood levels and science did not fall at the same rate as the overall decline. Therefore, Michigan produced relatively more

Michigan State University, Oakland University, and Western Michigan University.

^{af} The information in **Table 5** refers to the number of graduates prepared to teach in each of the identified subjects. A graduate may be prepared to teach in more than one subject and therefore can appear in multiple subject areas. For example, if an individual is prepared to teach Elementary Education and Mathematics, that person will appear in both subject areas. It should be noted that the number of graduates is not equivalent to the number of program "completers" identified earlier in this report. Completers represent individual people while graduates represent specific specialization areas that these individuals are trained to teach in. In 2015-16, there was a total of 3,120 program completers and these individuals were trained to teach in a total of 7,706 areas.

^{ad} The interim certificate is valid for five years and cannot be renewed. While some teachers may work in the classroom for the entire five years, many transition to a standard teaching certificate after completing all requirements of their alternative route program and successfully taught for three years. These transitions may account for some of the decline in teachers working with this credential since 2014-15.

^{ae} Central Michigan University, Grand Valley State University,

Table 5

Program Graduates by Subject Area, 2011-12 and 2015-16

“Top 10” Subjects	2011-12		2015-16		% Change Teachers
	Teachers	Share	Teachers	Share	
Elementary Education	2,624	21%	1,779	23%	(32%)
English/Language Arts	1,499	12%	886	11%	(41%)
Secondary Education	1,792	14%	844	11%	(53%)
Math	912	7%	579	8%	(37%)
Social Studies	856	7%	445	6%	(48%)
Special Education	672	5%	413	5%	(39%)
Early Childhood	421	3%	336	4%	(20%)
General	400	3%	308	4%	(23%)
Science	447	4%	308	4%	(31%)
History	494	4%	211	3%	(57%)
Total all Subjects	12,674		7,706		(39%)

Source: U.S. Department of Education, Title II Higher Education Act Report Card

teachers for these subject areas in 2015-16 as a share of the total, although still fewer in raw numbers compared to 2011-12.

A casual look at the data shows the relatively large share of teachers prepared to enter elementary school classrooms compared to other areas. Just about one-quarter (23 percent) of all graduates were trained in elementary education in 2015-16. This makes sense given the grade distribution of the state's K-12 student enrollment; approximately two-thirds of public school students were enrolled in grades K-8 in 2017-18 and 31 percent in grades 9-12.⁴⁶ As noted in the table, the third largest group of graduates in 2015-16 was secondary educators at 11 percent; their numbers are about one-half the number of elementary teachers produced.

Michigan is not alone in its high concentration of graduates in the elementary education field. Despite the fact that cross-state certification and hiring data can be imprecise and difficult to compare, many states find that they produce far more new elementary teachers than there are jobs in that setting.⁴⁷ And when an over-supply of elementary teachers exists in a state, there scholars debate what, if anything, should or can be done to address it. Policy responses are complicated by questions about who bears responsibility for aligning

supply of teachers in specific areas with local schools' needs, teacher preparation programs or state regulatory agencies. While the Michigan Department of Education exercises general oversight of programs, both public and private colleges responsible for preparing teachers exercise significant autonomy over college admissions, program entry and graduation requirements, and the quality of teacher preparation programs, overall. It is not clear how much programs can, or are willing to, do to address mismatches between a state's overall supply and demand for specific teachers. It is also a reality that neither the Department of Education nor individual programs hold much sway over individuals' decisions about what profession to pursue. However, the raw data clearly show that the share of elementary teachers is growing as a percentage of all graduates; this cohort's share of the total rose two percentage since 2011-12.

The teacher production data can also be examined in light of subjects identified by the Michigan Department of Education as shortage areas. Generally speaking, schools have reported to the department that they have the most difficulty filling vacancies in their science, technology, engineering, and math (STEM); special education; early childhood; and English as second language (ESL) classrooms.

Recent graduation numbers in these subjects, as well as changes over the five-year period, are reported in **Table 6**. Of the common shortage areas, both STEM and Special education numbers are down by the same

Nationally, this group of potential future teachers comprise over one-half of the supply needed to fill vacancies each year.⁴⁸ The ebb and flow of new certifications aligns with the trends observed at earlier phases in

Table 6

Program Graduates by Identified Shortage Area Subjects, 2011-12 and 2015-16

Shortage Area Subjects	2011-12		2015-16		% Change Teachers
	Teachers	Share	Teachers	Share	
STEM*	1,988	16%	1,212	16%	(39%)
Special Education	672	5%	413	5%	(39%)
Early Childhood	421	3%	336	4%	(20%)
English as Second Language	119	1%	130	2%	10%
Total all Subjects	12,674		7,706		(39%)

* Generally, STEM includes the various science, technology, engineering, and math subject areas individually reported on the Title II report, but aggregated here.

Source: U.S. Department of Education, Title II Higher Education Act Report Card

percentage as the overall decline in teacher graduates (39 percent). On the other hand, the number of teachers preparing for early childhood is down a little over one-half the aggregate decline. Bucking the trend over this period is the number of ESL-trained graduates. Although this group's share of the total is small, it is growing in size (both in raw numbers and as a share of the total).

Newly Certified Teachers Another widely cited shortage indicator relates to a key phase further down the teacher pipeline, state certification. Armed with their state license, most newly certified teachers are looking to land their first job in the profession. Most are trained at one of Michigan's traditional educator preparation programs, although this group also includes teachers gaining certification through one of the growing number of alternative route programs discussed earlier. It also includes individuals trained at an out-of-state program or a person with a valid out-of-state certificate gaining licensure in Michigan through a reciprocal agreement.

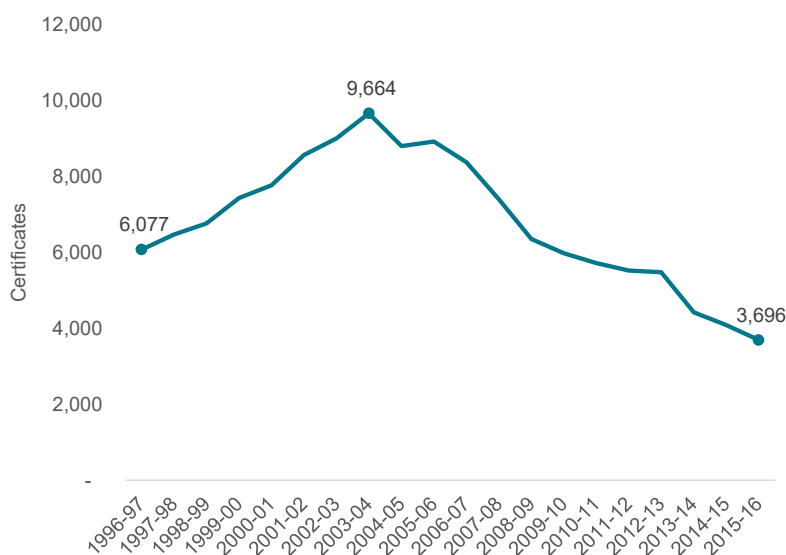
the teacher pipeline (i.e., teacher training enrollments and program completers). While the number of new certifications issued does not reflect the fact that many individuals will not teach in the subjects, grades or locales where teachers are most needed, it is an indicator of current supply and possible future shortage.

The number of initial teaching certificates issued by the State of Michigan peaked in 2003-04 at 9,664

after climbing from 6,077 certificates in 1996-97. Since the peak, the number of initial certificates issued declined 62 percent to 3,696 certificates in 2015-16; an average decrease of about 7.7 percent annually (see **Chart 14**).

Chart 14

Initial Teaching Certificates Issued, 1995-96 to 2015-16



Source: Michigan Department of Education

Teacher Certification

Michigan and other states seek to ensure teacher quality and effectiveness by means of teacher certification requirements that specify entry qualifications for the profession. States, not the federal government, are responsible for setting certification requirements.

Every state requires that teachers complete certain requirements in order to be certified to teach in that state. Generally, states require a combination of a test of basic skills, a subject knowledge exam, a subject specific pedagogy exam, and an assessment of teaching performance to obtain teacher certification. States vary in the specifics of these requirements and in some states the certification requirements for traditional public schools and charter school teachers are the same, while in other states they differ.

Under the traditional route to certification based in Michigan, a candidate must successfully complete a course of study at an approved teacher preparation institution. As part of their study, all teachers must learn how to teach reading by completing coursework in the subject. Additionally, teachers must pass a basic skills exam prior to doing their student teaching. Some teacher training programs require the applicant to pass basic skills tests before admission into the program. Also, they must pass the appropriate subject area tests related to the specific content the teacher will be endorsed to teach (called the Michigan Test for Teacher Certification or MTTC). With a few exceptions, Michigan requires that a person employed in an elementary or secondary school with instructional responsibilities must have a teaching certificate.ⁱ The standard teaching certificate is issued with an elementary grade or secondary grade authorization.ⁱⁱ An initial standard certificate is valid for five years.

Overall, Michigan’s experience with the percentage of public school students taught by a certified teachers aligns with the United States average and in some cases has a higher percentage of certified teachers instructing public school students (e.g., students attending city schools, students with disabilities, and English language learners). See **Table 7**.

Table 7

Percentage of Public K-12 Students Taught by Certified Teachers – Michigan and United States, 2012

	All Students	School Location				Student Characteristics	
		City	Suburban	Town	Rural	Students with Disabilities	English Language Learners
Michigan	94.2	95.8	92.6	91.2	96.8	95.9	96.5
United States	94.3	93.6	94.5	94.9	94.5	93.7	93.2

Source: Rahman, T., Fox, M.A., Ikoma, S., and Gray, L. (2017). *Certification Status and Experience of U.S. Public School Teachers: Variations across Student Subgroups* (NCES 2017-056). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Retrieved from <https://tinyurl.com/yccn3z2r>.

While the federal education law (i.e., No Child Left Behind) required states to staff every core academic class with a “highly qualified” teacher (i.e., a teacher that holds a bachelor’s degree, state certification, and demonstrated content knowledge), the current federal law, Every Student Succeeds Act (ESSA), abandons the “highly qualified” teacher requirement. Consistent with ESSA’s general approach to reduce federal involvement in education, the new law allows states the sole authority for prescribing teacher qualifications, including which teachers are qualified to deliver core content instruction.

More than 94 percent of teachers in the U.S. are certified, and in some states it approaches 100 percent.ⁱⁱⁱ Some states require teachers to have earned a master’s degree in order to be fully certified. However, research has found no consistent correlation of credentials - degrees including master’s degrees, experience after the first few years, or teacher test scores - with teaching skills.

i Michigan law contains exceptions to allow noncertificated individuals to teach in certain specialties and/or circumstances as long as they meet other specified requirements. For example, public schools can employ noncertificated, nonendorsed career and technical education (CTE) instructors to teach specific high school courses if an individual meets specified educational, experiential, and professional licensing/certification requirements. Additionally, the Detroit Public Schools Community District is allowed to hire a noncertificated, nonendorsed teacher if the district superintendent determines that, due to the individual’s combination of education and experience, it would be appropriate and in the best interests of the pupils of the community district.

ii Michigan currently issues the following teaching certificates: Standard, Interim, Two-year Extended Standard, Professional, Advanced Professional, Standard CTE, Two-year Extended Standard CTE, Professional CTE, Temporary Teacher Employment, Professional Temporary Teacher Employment, and Interim.

iii Rahman, T., Fox, M.A., Ikoma, S., and Gray, L. (2017).

As noted earlier in the discussion of Michigan teacher preparation completer activity, the pipeline has long produced more teachers prepared for the elementary school classroom than high school classroom. This trend is supported by state licensure activity (**Table 8**). The number of initial secondary education certificates

in subjects identified by the state as on-going shortage areas in its federal reporting: STEM (39 percent decline), special education (33 percent), early childhood (48 percent), English as a second language (12 percent), and career technical (54 percent).^{ai}

Table 8

Initial Certificates by Program Type, 2011-12 to 2015-16

Year	Initial Certificates	Elementary		Secondary		Occupational	
		Certificates	Share	Certificates	Share	Certificates	Share
2011-12	5,524	2,947	53%	2,480	45%	97	2%
2012-13	5,482	2,952	54%	2,419	44%	111	2%
2013-14	4,421	2,376	54%	1,973	45%	72	2%
2014-15	4,088	2,149	53%	1,886	46%	53	1%
2015-16	3,696	2,096	57%	1,545	42%	55	1%
% Change	(33%)	(29%)		(38%)		(43%)	

Source: Reproduced from 2017 Michigan Department of Education report, *Trends in Michigan Teacher Certification*

is down 38 percent and elementary certificates down 29 percent over the five-year period (2011-12 to 2015-16). As a result, the share of all certificates issued for elementary teaching increased from 53 percent to 57 percent during this period and the share of those prepared for high school teaching fell from 45 percent to 42 percent.

Subject Area Endorsement Examining changes in endorsement activity, indicating what subjects certified teachers are trained to teach, provides another view into the educator supply picture as well as possible shortage areas.^{ag} Overall, endorsement activity is down 44 percent from 2011-12 to 2015-16, but there is some variation across individual subject areas (see **Table 9** on page 34).^{ah} The number of endorsements declined

Re-Entrants to the Teaching Force

An often neglected source of supply in discussions of teacher labor imbalances is the pool of teachers that have left the workforce for personal or career reasons, but who maintain their teaching credential. Many often return to teaching at a later date. Former teachers represent a reserve pool that can help fill classroom vacancies when they occur. In Michigan, this is not an insignificant number; the Michigan Department of Education estimates that over 100,000 currently-credentialed teachers reside in state and do not currently teach. It should be noted that this roughly equivalent to the number of current teachers in public schools.

Research into teacher re-entry behavior and frequency shows that almost one-third of teachers who exit come back to the classroom within five years.⁴⁹ As a group, these returners are characterized as female, more experienced, and higher paid. The majority of re-entrants choosing to return do so in the first two years of leaving; the longer individuals wait to return, the less likely

ag Endorsement areas relate to specific subjects (e.g., language arts, math, social studies, etc.). Those receiving an elementary certificate are not required to gain subject area endorsement, but those teaching at the secondary level must have the appropriate endorsements before entering a high school classroom. For example, high school teachers teaching career and technical education classes will have a secondary education certificate with endorsement(s) in a related subject.

ah Individuals earning an initial certificate will often have more than one endorsement. This accounts for the fact that the

number of endorsements earned on initial certificates is greater than the total number of certificates issued.

ai The STEM category consists of a number of subject areas.

Table 9

Endorsement Activity in Identified Shortage Areas, 2011-12 to 2015-16

Year	Total* Endorsements	STEM	Special Education	Early Childhood	Bilingual	CTE
2011-12	8,027	1,885	833	514	162	193
2012-13	7,703	1,795	775	508	153	189
2013-14	6,005	1,501	650	355	131	133
2014-15	5,342	1,311	593	292	159	93
2015-16	4,480	1,152	556	265	141	88
% Change	(44%)	(39%)	(33%)	(48%)	(12%)	(54%)

* Total number of endorsements earned on initial certificates issued each year.

Source: Reproduced from 2017 Michigan Department of Education report, *Trends in Michigan Teacher Certification*

they are to come back. As a supply source for schools, returning experienced teachers are likely more attractive than hiring individuals just entering the workforce. Given the substantial improvements teachers make during their early years on the job, re-entrants will be more effective than new teachers. One caveat, however, is the fact that a younger teacher likely commands a lower salary than a returning one, something schools will also consider when they fill vacancies.

Given its relative size in Michigan (nearly 100,000 individuals) and potential to help address the stark decline in new teacher production, stakeholders may want to direct attention to this supply source as a strategy to address teacher labor market imbalances. One immediate problem facing stakeholders interested in tapping this supply, however, is the fact that little is known about former teachers' willingness to reenter the active teaching ranks and there is no good information about what it would take to incent their return to the classroom. State and local officials should further investigate policy strategies for attracting teachers to return. For example, it might be that some young female teachers that left the classroom to have a child face and wish to return do not have access to affordable, convenient, or quality child care. One national study found that 32 percent of former teachers considered available childcare options important in their decision to return, with this percentage even higher (57 percent) for younger teachers.⁵⁰

Out-of-State Teachers

States differ in the number of teacher preparation programs offered and their production of new teachers. This variation can influence how states meet their staffing needs. In some cases, in-state preparation programs, collectively, may over-produce teacher candidates for the state's needs. Some of this overage in supply will seek employment in other states. By one estimate, about one-quarter of all applicants for open teaching positions in the U.S. were from out of state.⁵¹ The variation in teacher production relative to a state's hiring needs, combined with the willingness of individuals to move around the country for employment, results in states being considered either net importers or net exporters of teachers.

The out-of-state teacher supply consists of individuals who either completed their formal training at a teacher preparation program outside of Michigan or those who hold an existing teaching certificate from another state and move to Michigan to work. Michigan's supply of teachers is aided by the fact that the state is open to teachers and graduates of teacher preparation programs from other states. State law and rules allow the Michigan Department of Education to enter into reciprocal agreements with other states to allow individuals who have a valid out-of-state licenses to teach in Michigan. Because out-of-state credentialing may differ, the department tries to match certificates, grade level and

content endorsements by conducting an evaluation of out-of-state applicants. Currently, Michigan does not report publicly the number of individuals who have been credentialed via a reciprocal agreement, thus we don't exactly know how many out-of-state trained teachers are in Michigan classrooms.^{aj}

Despite the lack of state information, federal data sheds light on the role that the supply of out-of-state teachers play in staffing Michigan classrooms. The U.S. Department of Education reports that 13 percent of teachers receiving initial certification in Michigan in 2012-13 were prepared by an out-of-state teacher preparation program.⁵² This compares to a national figure of about 21 percent.

Because of a lack of data, the degree to which Michigan exports teachers to other states is not known. Neither the Michigan Department of Education nor the state's training programs track this information. Back when program enrollments and completer numbers were much larger, it is likely that the state was a net exporter of teachers. However, there is some evidence, based on the recent decline in the number of program completers and school hiring activity, that the number of teachers exported has likely fallen.

Summary: Teacher Supply

To examine trends in teacher supply indicators, federal data covering teacher preparation program enrollments and completions is reviewed and analyzed. To gain insight into the classrooms and subjects that future teachers are training to teach in, certification and endorsement activity is examined. This activity is representative of supply points further down the teacher pipeline. Overall, the data show a shrinking supply

of new teachers being produced. Highlights from the research into statewide trends reveal:

- Between 2008-09 and 2015-16, enrollment at teacher preparation programs is down 66 percent. This drop follows a broader trend in Michigan postsecondary education enrollment (8.1 percent decline), but to a much greater extent. Michigan is not alone, as a national survey highlights that the number of high school students interested in an education major dropped to its lowest level on record in 2015. Across the country, enrollment in teacher preparation is down as well - 30 percent between 2008-09 and 2013-14. Fewer of the state's college students are preparing to become teachers, reducing a major source of supply.
- Looking at the number of students that complete their formal teacher training provides a clearer view of future supply further along the pipeline. Given the enrollment picture, it is not surprising

Overall, the data show a shrinking supply of new teachers being produced.

that the number of program completers also is down; from 2010-11 to 2015-16 the decline is 30 percent. Just over

3,100 individuals completed the requirements for their teacher prep program.

- Since 2010, Michigan has opened up another teacher supply line by authorizing alternative teacher certification pathways. While growing in number from one program in 2010 to eight programs today, these training institutions have not produced a large number teachers working in the classroom. Only 231 educators (out of nearly 100,000 teachers) had obtained an interim teaching certificate in 2017-18 from an alternative certification program.
- Michigan teacher preparation programs continue to produce more elementary teachers than any other subject area, but it is not clear how much these programs can, or are willing to, do to address mismatches between a state's overall supply and demand for specific teachers.
- Once freshly minted, many graduates of the state's teacher preparation programs pursue state certification, a requirement before they can enter the

^{aj} Michigan law allows the State Superintendent to issue a Standard Temporary Teacher Employment Authorization if an out-of-state applicant holds a valid, standard teaching certificate from another state. This authorization for employment is nonrenewable and lasts one year. The applicant can be employed as a teacher for a year while working to pass the required tests.

classroom. The number of initial teaching certificates peaked in 2003-04 (9,664 certificates) and has since declined 62 percent to 3,696 certificates in 2015-16.

- Certified teachers are required to obtain endorsements to teach specific subjects. Trends in endorsement activity show that overall activity is down 44 percent from 2011-12 to 2015-16, something you would expect given trends in program completions and state certifications. This data also provides insight into supply lines for shortage areas identified by the state. Over the five-year period, career technical endorsements are down 54 percent; early childhood endorsements are down 48 percent; STEM endorsements are down 39 percent; special

education endorsements are down 33 percent; and English as a second language endorsements are down 12 percent.

- The state's new teacher supply has shrunk considerably in recent years and there is nothing to suggest that current trends will reverse course in the near future. Given this trend and the need for schools across the state to fill vacancies arising from multiple factors, one supply source remains largely untapped – former teachers. Little is known about the 100,000-plus certified teachers not currently working and what it would take to entice their return to the classroom. Further state and local attention should be directed to this population.

Teacher Shortage Indicators – Statewide Perspective

Warnings of an impending statewide teacher shortage have been circulating for years. For many researchers and practitioners the shortage is a forgone conclusion and it is the size of the shortage that is up for debate. The challenges associated with diagnosing teacher shortages are complex. While it may be true that a state does not exhibit an overall shortage, this conclusion can mask very serious staffing shortfalls in particular regions. Teacher labor markets, like other labor markets, are inherently local in nature. Further, shortages can be confined to specific content areas.

In those cases where there is apparent consensus around the identification and quantification of a shortage, determining the appropriate interventions to better align supply and demand is complicated. Conventional supply and demand theory suggests that where the quantity of teachers demanded exceeds the quantity supplied, two basic interventions can be pursued: increase supply or decrease demand. However, within this broad framework of basic responses, a host of specific strategies exist that require careful consideration. For example, decisions must be made about who is in the best position to best address a teacher labor force imbalance: state-level actors (policymakers or administrative agencies) or local schools. At the state

level, solutions can be pursued through regulatory actions by administrative agencies (e.g., licensure requirements, informational campaigns) or state policymakers might consider more far-reaching changes. Localized responses might target recruitment, retention, or financial compensation initiatives.

Similar to many other pressing public policy issues facing Michigan, responding to teacher supply and demand challenges will require a multifaceted approach. No single approach will effectively deal with the different factors affecting both supply and demand simultaneously. However, the first order of business before developing strategies or policy responses is to take stock of what we currently know about Michigan teacher shortage.

The Challenge: Determining Whether There is a Teacher Shortage

As a state, Michigan continues to grapple with many public education issues (e.g., lagging student achievement, achievement gaps, school funding, etc.). Public policies to address teacher shortages, whether originating on the demand or supply side of the equation, will require precise data. As a state, Michigan has not invested much time or financial resources to study

teacher shortages.^{ak} One first step would be to produce a comprehensive study of teacher supply and demand and regularly update it.

The lack of public reporting and data surrounding teacher supply and demand makes it difficult to assess teacher shortages. Clear-cut data depicting a teacher shortage in Michigan is hard to come by. This report presents various components of teacher supply and demand that indicate shortages, but nothing definitive claims that a statewide shortage exists. Again, Michigan is not alone in neglecting the important data collection task. Only a handful of states, including Midwestern neighbors Minnesota and Illinois, produce formal teacher demand-supply reports.

While some state education agencies conduct teacher supply and demand studies to determine whether a shortage exists, approaches vary in complexity, the methodologies employed, data sources used, and the frequency. Some states update their studies regularly pursuant to state law or administrative rule, while other states study teacher shortages on an ad-hoc basis. In examining a selection of these studies, researchers found that some states rely on a single indicator of teacher shortage while others use multimethod approaches that rely on various indicators.⁵³

There is no universally accepted direct measure of teacher shortage. The term can take on multiple definitions and measurement methods. Those concerned with teacher shortages (e.g., parents, policymakers, school administrators, teachers, etc.) often define and measure the term differently. Given the lack of general consensus, these differences can contribute to wildly disparate depictions of the current state of the teacher labor market. As a result, accounts of school districts having difficulties hiring teachers, especially as the economy continues to expand and staffing becomes more challenging, are difficult to discern.

ak There is evidence that the general topic has gained more attention at the state level as part of the strategic goals behind the Michigan Department of Education's "Top 10 in 10" plan. See https://www.michigan.gov/documents/mde/MDE_Goals_and_Strategies_2-8-16_514042_7.pdf and https://www.michigan.gov/documents/mde/Educator_Staffing_Strategic_Plan_612221_7.pdf

Survey of Teacher Supply/Demand Reports

States employ two common approaches to analyzing the imbalance between teacher supply and demand. One method focuses on a single indicator. These analyses rely on data from a single source (e.g., number of emergency teaching permits issued allowing non-certified teachers to teach a specific subject). Another approach involves examining multiple components (both supply- and demand-side) to determine the existence and magnitude of a shortages, either for a state/school district as a whole or for a specific subject area. Comprehensive studies rely on data from multiple sources.

A number of states are required, by state law, to produce annual teacher shortage reports. These reports tend to examine a host of both supply and demand indicators in an effort to determine the extent to which shortages exist. Other states have formed task forces or working groups to examine teacher shortages at a particular point in history. Often, these efforts are designed to serve

as the informational component for potential policy solutions or other interventions.⁵⁴

Clear-cut data depicting a teacher shortage in Michigan is hard to come by.

Even among the group of states that annually produce teacher shortage/surplus reports, there is considerable variability on many dimensions, including data used and methodologies employed. For example, within the seven Midwest states, two states rely solely on a single indicator for determining a teacher shortage; three states use data from multiple sources (state collected data and outside sources); and two states conduct projections as part of their assessment of supply and demand.⁵⁵

The Minnesota Department of Education is required to produce a report on the supply and demand of teachers. The report is mandated by state law based on data collected from schools (both traditional districts and charter schools), as well as teacher preparation institutions. Additionally, the report relies on information maintained by the state teacher accreditation board (e.g., special teaching permissions), state health department (e.g., county-level birth statistics), and U.S. Census Bureau (e.g., county-level population estimates). Surveys are developed and used to

collect information from school district hiring officials (e.g., barriers to hiring effective teachers) and teacher preparation institutions (e.g., impediments to teacher preparation).

The report is presented to the state legislature and used by other interested organizations to inform state policy discussions. It is organized around the following five research questions:⁵⁶

- 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 for the next three, five, and 10 years?

Minnesota provides an example for Michigan to emulate for the study of teacher labor market shortage. Of course, every state is unique. As general steps to implement such a policy, Michigan would have to first settle on the research questions to guide its inquiry, settle on a methodology, identify its data needs (existing and future), collect and prepare data, and then do the analyses and report findings.

School Hiring Activity

It is clear from the trends in teacher preparation program enrollment and completions, as well as state certification/endorsement activity that a major source of the teacher supply statewide is shrinking rather significantly. What is not clear is whether, at current levels, there is ample new supply to meet teacher demand arising from school hiring needs. Unfortunately, Michigan does not collect and compile statewide data on annual school

district hiring activity. Also, the information it does collect that might be used for this purpose is not publicly available. While school districts may provide information on an ad hoc basis as part of a newspaper story or other reporting, they don’t publicly report the data on their own nor are they required to do so. The dearth of consistent and regularly updated school personnel hiring information is another impediment to assessing the true picture of teacher shortages.

The Michigan Department of Education does not track teacher vacancies or hiring activity across the roughly 897 public school districts in the state.^{al} Although the state is not collecting and updating hiring data on a regular basis, a recent Michigan Department of Education policy brief sheds light on statewide hiring trends. This snapshot report examines the number of individuals gaining teaching employment in Michigan schools for the first time in each year, 2011-12 through 2016-17.⁵⁷ The information was reported on statewide basis and did not dive into district- or school-level activity, thus limiting its value. This data provides another broad look into the current status of the teacher labor market and whether there is evidence of either an over- or an under-supply of teachers in Michigan (see **Table 10**).

On a statewide basis, Michigan consistently has been producing more teachers than districts have openings

Table 10
Initial Certificates Compared to Newly Hired Teachers, 2011-12 to 2016-17

	Initial Certificates	New Teacher Hires	Difference	Over-Supply
2011-12	5,721	4,159	1,562	38%
2012-13	5,524	3,948	1,576	40%
2013-14	5,482	3,729	1,753	47%
2014-15	4,421	3,515	906	26%
2015-16	4,088	3,322	766	23%
2016-17	3,696	3,154	584	19%

Source: Reproduced from 2017 Michigan Department of Education report, *Trends in Michigan Teacher Certification*

al For the 2017-18 school year, the state’s 897 public school districts consisted of: 545 traditional public, 295 public charter, and 57 intermediate school districts. These districts operated a total of 3,433 individual schools of various grade configurations.

that they need to fill. However, this over-supply appears to be shrinking. In terms of the raw numbers reported, the over-supply (initial certificates minus new teachers hired) shrank by nearly two-thirds since 2011-12 (from 1,562 to 884). Measured as a percentage of the number of openings filled each year, the over-supply has been halved (from 38 percent in 2011-12 to 19 percent in 2016-17). Both measures point to the same conclusion: one component of teacher supply (new certificates) is shrinking at a faster pace than demand (new hires). Of course, statewide demand for teachers can be met from other sources, including the reserve pool of teachers. At the local school level, staffing vacancies (new hires) can be filled from the supply of existing teachers that have chosen to change schools.

Since 2013-14, there has been a noticeable convergence in the primary supply of teachers (as represented by the number of initial certificates issued annually) and the number of new teachers hired; however, it is unknown whether this trend will continue. Additionally, statewide data presented in this report do not address regional needs or the needs of individual school districts.

Both measures point to the same conclusion: one component of teacher supply (new certificates) is shrinking at a faster pace than demand (new hires).

Use of Non-Certified Teachers - Substitute Teacher Permit Activity

Michigan law requires public schools to staff classrooms with certified and endorsed teachers.^{am} To address needed exceptions to this requirement, state law allows the use of substitute teachers when a fully-credentialed teacher is not available. Districts must obtain substitute permits to employ substitutes.

^{am} Michigan law allows specific exemptions to this general certification/endorsement requirement such as allowing schools to hire individuals to teacher courses in computer science, a foreign language, mathematics, biology, chemistry, engineering, physics, robotics, or in another subject area determined by the state board of education or in an industrial technology education program or a career and technical education program. Noncertificated/nonendorsed teachers must meet other minimum educational and/or professional experience requirements.

Substitute teachers are an essential component of properly staffed classrooms. They provide instruction when full-time teachers are unable to work because of illness, caring for a family member, dealing with an emergency, or engaging in training/professional development. Michigan schools rely on substitute teachers every day. When schools have a difficult time finding full-time teachers because of a general or localized shortage, the demand for substitute personnel increases. Heightened use of permitted substitutes can serve as a broad indicator of a teacher shortage.

Michigan law authorizes a variety of substitute permits designed to meet schools' individual staffing needs. Permits are authorized for general education as well as career and technical education and special education program assignments.^{an}

The most common permit types within the general education setting, include daily, full-year, expert, and shortage. Briefly, the *daily permit* is what most people commonly associate with substitute teaching. This permit is issued for intermittent placements of no more than 90-calendar days to help schools meet sporadic staffing needs. As the name indicates, a *full-year basic permit* can be used for the entire school year and is intended to meet schools' longer-term staffing needs. The *expert permit* is designed to allow individuals with at least five years of professional experience (e.g. science-related field) to teach in a public school classroom (e.g., chemistry). The permit is capped at one-half of a full-time teaching position (e.g., substitute can teach classes for up to one-half of a school day). Another permit type, *full-year shortage*, was first authorized for the 2018-19 school year and is limited to certified teachers that want to work in another assignment area (e.g., one where they are not currently endorsed). The permit is capped at one-half of a full-time teaching position.

^{an} For purposes of teacher shortage discussion, the most common permits within the general education setting are covered here. Permit requirements for special education and career and technical education assignments differ.

In recent years, Michigan school districts have increased their reliance on substitute teachers to staff general education classrooms. The number of primary permit types issued (daily, full-year, and expert combined) has increased 19 percent since 2012-13 (see **Table 11**). Issuance of the daily permit type, which accounts for the vast majority of issued each year, increased 14 percent over the recent five-year period.

From a statewide perspective, the aggregate data is one of several reliable indicators of a teacher shortage. But, this data does not provide any indication of permit issuance by locale or specific classroom vacancies and clearly cannot present a complete picture of teacher shortages or unfilled teacher positions.

Table 11
Various Substitute Teacher Permits, 2012-13 to 2017-18

Permit Type	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Daily	21,034	20,598	21,123	22,168	23,133	24,067
Full-Year Basic	213	168	235	347	836	1,184
Expert		6	11	15	30	40
Total	21,247	20,772	21,369	22,530	23,999	25,291
Annual Change		(2.2%)	2.9%	5.4%	6.5%	5.4%

Source: Michigan Department of Education

Shortages by Teaching Field

A widely used indicator of a teacher shortage is the difficulty districts have in filling vacancies. Local media often cover stories of individual districts’ challenges finding qualified teachers for specific fields. These one-off accounts, helpful in highlighting what is taking place in Marquette, Manistee, or Muskegon, lack a statewide perspective of current trends.

Beyond the local stories from the different parts of the state, the Michigan Department of Education annually compiles two lists of hard-to-fill positions for specific teaching fields. These reports aggregate local experiences, providing yet another statewide indicator. The purposes and statutory backgrounds for each list differ. One is required by federal law for the U.S. Department of Education (DOE) and provides a listing of teacher shortage areas (subjects) by state. The second list, commonly called “critical shortage”, is produced to comply with Michigan law and relates primarily to rehiring retired personnel to allow them to work in specific

fields within schools dealing with staffing problems. Retired teachers hired to fill positions on the list do not have to sacrifice their pension or retiree health benefits upon returning to work in public schools.

Both reports are based on self-reporting done by local districts, including requests for substitute teaching permits. The local information supplied is not subject to extensive state review. Because of these factors, the reports can only be consider an indicator of local experience.

Federal Teacher Shortage Areas The federal listing of teacher shortage areas is based on information and data submitted by each state.⁵⁸ The listing does not represent actual open job postings within a state, but instead signals subject areas in which a state is having a difficult time filling positions.⁵⁹ In compiling state lists for the federal government, U.S. DOE suggests states consider teaching positions

under three categories: 1) positions that are unfilled; 2) positions filled by teachers holding a provisional, temporary, or emergency certification; and 3) positions filled by certified teachers working outside of their area of expertise.

Looking at the entire national report broadly, it is clear that nearly every state reported some shortage of teachers; however, states vary as to the number of shortage areas and the specific subjects. Despite the state-by-state variance, a few common themes can be found in the listing. First, states commonly identified special education as the field with the most acute

ao The primary purpose of the DOE’s list is for determining eligibility for deferment of certain federal loans. Depending on the specifics of the loan program, teachers teaching in shortage areas can be eligible for up to 100 percent cancellation of their student loans. The federal loan programs related to the DOE’s Teacher Shortage Areas include: Family Federal Education Loan Program, Federal Supplemental Loans for Students, Federal Perkins Loans Program, and Teacher Education Assistance for College and Higher Education Grant Program.

A Shortage within a Shortage?

In addition to dealing with full-time teacher shortages, evidence is mounting that many Michigan schools are finding it difficult to staff classrooms with substitute teachers when the need arises.ⁱ This is occurring at the same time that the demand for substitute teachers (number of permits requested) is on the rise. With increasing demand and shrinking supply, the substitute shortage adds another dimension to the labor market imbalance in schools.

While the causes are not fully documented or understood, some industry observers suggest the shortage relates to the general decline in the number of people pursuing teaching full-time and the general factors contributing to full-time teacher shortages. It has been a longstanding practice that substitute teaching positions were filled with recent education graduates with full certification looking to gain valuable classroom experience and demonstrate their skills to future employers. They took substitute jobs while they pursued full-time positions. Given the supply squeeze, the “typical sub is 43, predominately female and a returning-to-work mother without a teaching certificate,” according to Clark Galloway, president of EDUStaff, a private staffing firm.ⁱⁱ

In many parts of the state, firms like EDUStaff are responsible for supplying substitute teachers to districts. They are responsible for recruiting, screening, and assigning teachers for various districts. By working with a number of nearby districts, firms are able to assemble a pool of available substitute teaching staff to work in needy districts. In public testimony before state legislative committees as well as newspaper stories, company representatives explain that Michigan is not unique and many states across the nation are finding it challenging to find substitutes. In Michigan specifically, they point to the fact that fill rates – or the percentage of substitute positions that firms are able to fill when demanded – have dropped from 95 percent in 2012 to 85 percent in 2015 as evidence of the substitute teacher shortage.ⁱⁱⁱ

In addition to industry testimony, the State of Michigan has officially acknowledged the substitute teacher shortage. Since the 2015-16 school year, the state has included all substitute teacher disciplines on its list of “critical shortage disciplines.” This list (detailed later) generally allows schools to employ retired school personnel as substitute teachers without those individuals having to sacrifice their pension or retiree health benefits during the time that they are employed as a substitute.

Given state permitting requirements to work as a substitute, districts have limited options to address the supply angle of the problem. One solution within their direct control is to increase compensation. Reportedly, the daily rate for substitute teaching in Michigan varies by district (\$75 to \$100). Recently, Ann Arbor Public Schools used a rate increase to address its situation with some success.^{iv} After raising the daily rate from \$75 to \$100, the district saw its monthly substitute fill rate jump from mid-80 percent to mid-90 percent.

Looking beyond compensation as a tool, some schools have pursued state policy changes to address the issue on the supply-side of the equation. Michigan recently lowered the threshold for substitute teaching by changing the qualifications to enter the profession. Public Act 236 of 2018 reduced the number of college credit hours from 90 to 60, the equivalent of an Associate degree, for an individual to be granted a substitute teaching permit. Another recent change (Public Act 418 of 2018) allows an individual who can demonstrate expertise in a field and holds either a professional license or certification to work as a substitute teacher in certain fields. These statewide approaches seek to expand the potential supply of substitutes by providing alternative access routes into the profession. Time will tell whether these policy changes will be effective in addressing Michigan's substitute teacher shortage, as other factors are also at play such as the state's current tight labor market.

i Higgins, Lori. (2016, December 27). “Wanted: Substitute teachers for Michigan classrooms.” *Detroit Free Press*. Retrieved from <http://freep.com>.

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iii Cook, Katie. (2017, January 6). “MI schools struggle with lack of substitute teachers.” *WKAR Radio*. Retrieved from <http://wkar.org>

iv Knake, Lindsay. (2015, December 20). “Substitute teacher fill rates rise in Ann Arbor with increase in pay.” *MLive*. Retrieved from <http://mlive.com>

shortages. In 2015-16, 48 states included either special education generally or many specific subfields in their submission to the U.S. DOE.⁵⁹

Mathematics and science teachers were a second hiring challenge found across the county. Forty two states reported shortages in mathematics and 40 states reported shortages in science. For many states, special education along with math and science teaching positions have been considered tough-to-fill for some time. Individuals with math and science training are sought after in the broader labor market where more opportunity and higher earnings exist.

A reported shortage of bilingual education teachers and English as a second language (ESL) teachers presented a third similarity among the states. More than 30 states identified a need to hire ESL teachers. The demand for bilingual educators varies with a state’s demographics; those states with higher concentrations of non-English speaking populations are seeing the greatest need and therefore challenge.

Examining Michigan’s recent submissions shows many similarities with other states’ experiences, especially in the area of special education. Also noticeable is the growing number of shortage area types reported by the Michigan Department of Education over the last five years. This suggests a broadening of the shortage problem.

Table 12 provides a summary of recent state-identified teacher shortage areas.^{ap}

ap For this summary, the U.S. Department of Education’s online tool was used to generate Michigan-specific reports for each year (2014-15 through 2018-19) - <https://tsa.ed.gov/#/home/>. This summary includes statewide shortage areas identified by subject matter. Within each subject matter there may be multiple disciplines, grades, or geographic locales identified. For example, within the “core subjects” listing for 2018-19, the report limits the shortage area to pre-kindergarten and elementary grades. Similarly, within the “career and technical education” listing, multiple disciplines are included in each year.

Michigan’s Critical Shortage List Michigan law restricts certain retired public school teachers and other personnel who receive a pension from the Michigan Public School Employees Retirement System (MPERS) from becoming re-employed on a full-time basis by their former school district or another district. The restrictions on retirees returning to work, either directly or indirectly, are intended to prevent “double-dipping.” This occurs when a retiree receives a salary and his or her full pension.^{aq} But they also have the unintended effect of closing down a teacher supply source for schools (i.e., re-entrants).

State law provides exceptions to these post-retirement employment restrictions under certain limited circumstances, generally falling into two categories,

Table 12
Federally-Designated Teacher Shortage Areas, 2014-15 to 2018-19

Subject Matter	2014-15	2015-16	2016-17	2017-18	2018-19
Career and Technical Education	X	X	X	X	X
Special Education	X	X	X	X	X
English as a Second Language	X	X	X	X	X
World Languages	X	X	X	X	X
Mathematics			X	X	X
Arts and Music				X	X
Health and Physical Fitness				X	X
Language Arts				X	X
Social Studies					X
Science					X
Psychology					X
Core Subjects					X

Source: U.S. Department of Education

aq The restrictions described here apply to individuals who retired after July 1, 2010, which corresponds with an early retirement incentive made available to eligible school personnel. Retirees are allowed to return to work and receive their full pension, but their annual earnings are limited to one-third of their former compensation. If a retirant’s earnings exceed this limit, they forfeit the pension and health care benefits they receive until their employment ceases. If a retired teacher or administrator returns to work indirectly for a school district, either for a third party or as an independent consultant, and they perform a “core service,” they will forfeit their pension and health care benefits while they remain employed. Unlike direct hires, indirect hires are prohibited from working even part time for their former employer or another district without sacrificing receipt of their pension and health care benefits during employment.

1) employment in a “critical shortage discipline,” and 2) employment as a substitute teacher, instructional coach, or school improvement facilitator. Michigan’s shortage listing is primarily based on substitute teacher permit requests made of the Michigan Department of Education by individual districts and by feedback provided by districts; however, inclusion of a discipline generally signifies a statewide shortage.^{ar} The state’s shortage list, just like the federal listing, represents another indicator of the scope and nature of current staffing imbalances. While short of precise numbers

(e.g., districts submitting requests), general subject area shortages can be gleaned from the report.

Many of the same disciplines that appear on the federal listing also appear on the state’s list. For the 2018-19 school year for example, special education, career and technical, and world language are included in both listings. Districts are able to hire retired teachers to meet staffing needs in these and other fields and those Individuals are able to return to public school teaching without reduced retirement benefits.

Policy Considerations

A number of factors have contributed to the workforce challenges facing public schools. Similarly, possible solutions to the issue must be multifaceted. Simply stated, there are no “silver bullets.” Given this, the following identifies considerations to help frame the conversation on the future of the teaching profession in our state and possible policy interventions.

Future discussions about what to do about teacher workforce challenges have to be placed in the context of the diversity of the public education system, the various entities involved in the teacher pipeline, and fiscal constraints facing these entities. First and foremost, it must be acknowledged that public education is not monolithic. Michigan is home to 897 school districts operating nearly 4,100 schools of various grade configurations. Over 1.5 million students are enrolled in public schools and student demographics vary considerably across districts and even buildings within districts. Most importantly, academic needs also vary. This variation means that students often require a unique set of school resources to learn and achieve, including the most important in-school factor for student success, effective teaching. While proposed policies may be directed a broadly at the entire workforce, it is

likely that the most effective interventions will be those that target a specific subgroup of potential or current teachers.

Local schools, particularly parents, administrators and teachers, are often the first stakeholders to recognize, diagnose, and act to address staffing challenges. And while they can identify, develop, and adopt strategies to influence certain aspects of the labor demand/supply puzzle, their ability to effect broader change along the teacher pipeline is limited. When staffing problems are more systematic in nature, extending beyond a single district’s borders or its ability to bring change, other stakeholder groups must act to correct imbalances in the teacher labor market.

A number of entities are invested in and directly influence the health of the state’s teacher pipeline. Each of these has its own mission, constituencies, and interests. While each is linked in some way to the teacher pipeline, given the nature of organizations generally it is not unreasonable to believe that many operate in silos. Addressing educator workforce imbalances will require partnerships between many of these entities. For example, a growing number of districts have begun partnering with teacher preparation programs to produce teacher candidates who better meet district needs. Partnerships, especially when financial resources are limited, can be an efficient model for entities to meet various workforce needs and challenges throughout the pipeline.

Finally, schools, along with other public entities involved in the pipeline, face budget constraints. They must prioritize the limited funding they have. It is likely

ar Michigan first developed a “critical shortage” list in 1999 in response to school districts across the state reporting difficulties hiring qualified teachers (this listing is separate from the federal shortage list discussed earlier). One specific motivation for the state policy change and the development of the critical shortage list had to do with addressing nearly 1,000 teaching vacancies in the Detroit Public Schools District in the late 1990s. At the time, the district was undergoing reforms by the state-led Detroit Reform School Board and was looking to hire retirees to fill vacancies and replace long-term substitutes.

that adopting and implementing any policy to address workforce challenges will require additional public resources. Unlike in other states where school funding remains a local decision, Michigan has centralized school funding at the state level. Further, state tax limitations act to constrain schools' ability to generate additional local-source resources. And while it is possible that some schools may be able to generate private/philanthropic resources to fund strategies, this option is not universally available. Therefore, it is likely that additional resource commitments will have to come through the already tight state budget, thus requiring state-level actors to take the lead in advocating for policy changes and championing the call for the requisite financial resources.

Better and Timely Information

As a state, Michigan has not prioritized studying teacher labor markets and the shortage issue. This is evidenced by the lack of available, timely and relevant information related to the various components of the educator labor force and the factors influencing them. As we have pointed out here, Michigan has not engaged in the necessary work to identify statewide trends in teacher shortages and surpluses and whether those trends vary by teacher certification area, region of the state, district locale, and teacher demographics. Using only publicly available data sources about Michigan's teacher pipeline, this report finds that it is difficult to answer many of the critical questions a policymaker, local school official, teacher preparation program leader, or a researcher might find central to ensuring a sufficient teacher workforce today and down the road. State policymakers should pursue a systematic analysis of the data needs related to the factors driving the supply and demand for teachers.

A good first step would be to create a task force or work-group tasked with examining shortages and providing potential solutions to various education stakeholders. This will require taking stock of current and requisite data needs within the state, among the intermediate school districts, and for individual local districts; settling on analytical methods; and reporting out findings. Results and findings from this inquiry must be shared to inform decisions made throughout the pipeline, in-

cluding sharing with state-level policymakers to inform their decisions concerning the teacher workforce. Other states, including our Great Lakes states neighbors Minnesota and Illinois, offer examples of how Michigan can proceed down this path. If Michigan wants to seriously tackle the workforce challenges facing schools, it must make the issue a statewide priority. Leadership in this effort must come from all entities that have a stake in the health of the state's teaching force, but it can start with direction provided by state officials.

The National Council on Teacher Quality in its recent assessment of Michigan's teacher policy performance recognizes improvement is needed with workforce information. The Council issued the state an overall grade of C in 2017, but awarded its second-lowest mark for Michigan's attention to workforce status information: "The state should publish data on teacher production that connect program completion, certification, and district hiring statistics, and also provide guidance regarding program acceptance numbers."⁶⁰

Getting Potential Teachers into the Pipeline

Data presented in this report show that fewer high school students are entering college with the intention of entering the teaching profession and leakage throughout the pipeline of getting those in the teacher preparation programs into a teaching career is considerable. As is the case for nursing and some other professions, teaching is often considered a calling. But if those that hear the calling do the math associated with getting a degree and examine their potential earnings upon entering the field, they might pursue another calling. Programs can be developed to overcome this obstacle.

Teacher Loan Forgiveness and Assistance Michigan has some of the highest student loan debt in the country. For the class of 2017, Michigan ranks 11th nationally with each graduate holding an average of \$31,289 in student debt when leaving college. Some 58 percent of graduates owe money on student loans.⁶¹

The federal government offers loan forgiveness programs for individuals seeking a teaching career. Generally, borrowers must commit to work for five consecutive years in a high-needs school and make regular

Michigan has some of the highest student loan debt in the country.

subsidized loan payments. For the typical teacher, up to \$5,000 in student loan debt can be forgiven after completing the service requirement. Those teaching in math, science, or special education can have up to \$17,500 forgiven.

The state does not currently offer such a program for teachers, but it does for doctors. Michigan administers and partially funds the Michigan State Loan Repayment Program, part of a federal, state, and local partnership designed to help employers recruit and retain primary care doctors. Participants must provide full-time primary healthcare services in federally-designated shortage areas at not-for-profit health clinics for two years. The program provides up to \$200,000 in tax-free funds to repay educational debt over a period of up to eight years.

The existing Michigan State Loan Repayment Program could be used as a model for the teaching profession. Initiating a state program could incentivize teachers to enter and remain in the workforce. It could be structured to address the needs of school districts experiencing the starkest labor challenges.

Another debt-related intervention could be to develop a student debt assistance program to encourage people to stay in the profession. Debt assistance differs from loan forgiveness basically in the timing of the benefit; loan forgiveness occurs after a set period of service while debt assistance is provided in the form of an annual benefit while the individual continues with regular loan repayments. Assistance programs can be structured to provide an increasing benefit after each full year in the classroom, with a maximum cap based either on total assistance or years participating. Annual bumps in the benefit may serve as an added incentive to keep teachers in the classroom.

Service Scholarships In addition to loan forgiveness, a targeted scholarship modeled after the nationally-recognized Kalamazoo Promise could incentivize students to enroll in and complete the requirements for teacher preparation. The Kalamazoo Promise was created in 2005 through private donations. It offers large college

tuition subsidies to graduates of Kalamazoo Public Schools (KPS). The only conditions to qualify for the Promise are that a student be continuously enrolled in KPS since at least ninth grade, that he or she live in the district and graduate from KPS, and that he or she is accepted to attend any public college in the state.⁶²

Since its creation, other Michigan communities have adopted a variation of the Kalamazoo Promise for their high school students. A statewide promise program could be created to train teachers for high-demand classrooms or to teach in high-need schools. Rather than developing programs to relieve college debt, a promise program would keep students from amassing debt.

Generally, promise programs are place-based and not content-specific. If paired with a “grown your own” strategy, students from high-need communities across Michigan could be rewarded for academic success and returning to their communities to give back. Often they are limited to residents of a specific community, such

as the Kalamazoo model, which has shown to have positive impacts on college enrollment, choice, and degree completion.⁶³

Tapping into the Supply of Former Teachers With the dwindling supply of new teachers coming out of the state’s traditional and alternative pathway teacher preparation programs, consideration needs to be given to the nearly 100,000 former teachers that currently hold a valid teaching certification and live in Michigan. Little is known about this reserve pool of teachers, such as their reasons for exiting the workforce in the first place and what it would take to bring them back. Without this basic information, stakeholders cannot craft specific strategies. The lack of relevant information about this potentially large supply source (roughly the size of the current teaching force) speaks to the low priority given to teacher labor market issues in the past.

The first order of business is to analyze the information the state already has about this population, such as basic demographic, education and training, certification, school assignment, and employment history.

With the dwindling supply of new teachers coming out of teacher preparation programs, consideration needs to be given to the nearly 100,000 former teachers that hold a valid teaching certification and live in Michigan.

Additionally, a survey would provide insight into their reasons for leaving as well as what might motivate them to return. Research shows that re-entry behavior is closely linked to teachers' family situations. For women, one consideration in their decision to return to the classroom relates to timing – when their children reach school age. Given this, access to convenient, affordable, and quality childcare may be something that stakeholders need to address to entice former teachers to come back.

Tackling Michigan's High Turnover Rate: Focus on Retention

Michigan's teacher turnover rate is high and a major cause of staffing problems. It is particularly problematic in the state's charter schools, urban schools, and those with high-concentrations of poverty. Developing effective retention strategies requires a thoughtful, context-specific, and comprehensive approach. Successful strategies focus on compensation, teacher preparation, support and professional development, along with school leadership and organizational considerations.⁶⁴

Compensation Michigan does not have a statewide teacher salary schedule like many states, therefore pay and compensation structures are determined locally. Generally, retention is aided when compensation packages are competitive with those other occupations requiring the same educational background, training, and experience. This ensures that the education sector can compete in the labor market for well-qualified teachers. Examining compensation across any occupation can be fraught with claims and counterclaims: the public teacher salary debate is no different.

In 2016-17, the average teacher salary in Michigan was roughly \$62,380. While up from the previous year, the statewide average had been declining for a number of years. At the average, Michigan compensates its teachers well compared to schools across the country (11th highest in the U.S. in 2015-16) and 10 percent higher than the U.S. average.⁶⁵ However, when it comes salaries for those entering the workforce, Michigan's average starting salary (those on the job two for fewer

years) is 3.5 percent below the U.S. average.⁶⁶ It should be noted that this, again, is an average figure and starting salaries range across the state. Michigan teacher salaries don't begin to eclipse the national average until an individual gains six or more years of service. As is shown, attrition rates are highest for the newest teachers so many don't make it to their sixth year in the classroom.

Money may not be the most important factor for an individual choosing a career in education, but it is common reason given when teachers leave the profession before retirement. Developing ways to increase starting salaries may go a ways toward encouraging individuals to enter the profession and retaining current teachers.

Michigan's teacher turnover rate is high and is particularly problematic in charter schools, urban schools, and those with high-concentrations of poverty.

In addition to ensuring starting salaries are competitive, differential pay systems can be employed. These take into account the job prospects and earning potential that certain

teachers have outside the school setting, such as those trained in specific high-demand content areas (e.g., science, technology, special education). Twenty-three states use some form of diversified pay structure.⁶⁷ Implementing differential pay, especially for entry-level positions, may require schools to break from the traditional salary schedule model that stipulates that salaries be based entirely on years in the classroom and academic credentials. Differential pay is an especially important strategy when retention is a challenge in hard-to-staff subjects or school settings.

Schools also can look to targeted financial incentive programs. For example, they can use pay-for-performance or merit pay components within their compensation systems to ensure effective teachers do not exit the profession for the allure of greater earnings outside of education. Michigan law already requires schools to use merit pay based on student growth to some degree, but very few have embraced the concept.⁶⁸

Preparation and Support As was discussed, retaining early-career teachers is an issue across the state, but some school districts are especially plagued by high attrition rates. One avenue the state can pursue is to invest more in teacher preparation, support and

development strategies that target retaining teachers in high-need settings and shortage areas. High-quality teacher residency programs are a promising approach employed across the county requiring local schools to partner with teacher preparation programs to provide aspiring teachers an opportunity to learn in same environment where they will eventually work. These operate similar to medical residency programs, allowing participants to get individualized training and mentoring by master teachers. They should rival medical residency programs in length, much longer than the half year of paired classroom experience many rookie teachers currently experience. They can be structured in a way to reduce typical higher education financial burdens if they are paired with stipends, allowances for living expenses, or debt forgiveness.

Another promising model of teacher preparation involves recruiting individuals into the profession from a school's immediate community, such as current students or employees. The "grow your own" approach requires schools to work with teacher preparation programs – traditional and alternative route – to ensure schools' unique staffing needs are met. The majority of teachers that grow up in urban or rural settings go on to work in those settings. Capitalizing on individual preferences to stay close to home can be an effective retention strategy.

Once again, the medical field offers a model that could be replicated. The MIDOCS program is a state-funded program through which several Michigan universities

that train doctors identify applicants from underserved areas, train them in select specialties, and then work with those communities to locate and house physicians for their first years of residency.⁶⁹

School Organization and Leadership Like any other organization, local schools have their own culture, practices, policies, and characteristics that can be influential in a teacher's decision to remain in the classroom. Unlike changes to salary schedules or teacher recruitment and preparation to address retention issues, a school's organizational conditions are less costly to modify and directly under the control of local schools. It has been demonstrated that schools with "positive" organizational conditions – teachers provided with more school-wide decision-making authority and classroom autonomy – have lower turnover rates, especially among minority teachers.⁷⁰

School leadership also matters when it comes to combating high rates of teacher turnover. It is often one of the top reasons cited in teachers' decisions to leave a school or exit the profession, appearing before salary issues. Attributes and definitions of a "quality" leader may vary, but evidence suggests two components of school leadership that are integral in the retention puzzle – administrative support and leadership style. Weak principal leadership is identified as an important variable in teacher turnover in schools dealing with already high turnover rates, such high-poverty, low-achieving schools, placing further emphasis on improving leadership in those settings.⁷¹

Conclusion

Research has demonstrated that teachers are arguably the most important in-school component in the formal education delivery system. The Michigan Constitution guarantees a free public elementary and secondary education to all the state's children. Responsibility to ensure that this mandate is met lies with the state government, although a lot of the authority over public education has been delegated to local school districts. To the extent that the state's classrooms are not adequately staffed with teachers, the state has failed in its constitutional responsibility. Ultimately, state government must act to fulfill its duty.

To better understand how the state is fulfilling its responsibility, this report set out to ascertain whether Michigan public schools are facing teacher shortages in varying regions of the state and across specific subject areas within schools. Because of data limitations, we were not able to do the "deep dive" we had hoped for, but based on available state and federal information we were able to identify and analyze a number of state-level patterns and trends in teacher demand and supply along with broad shortage indicators in some subject areas.

The available public evidence shows some leaks in Michigan's teacher pipeline. On the demand-side of the teacher shortage equation, the signals coming from a number of influential factors (e.g., student enrollment, teacher attrition and turnover, and funding) are mixed. Overall, student enrollments are trending down and show no change in direction looking forward. In response, the state's teaching force has shrunk more or less in tandem. However, the composition of the state's student population is changing in important ways that impact the demand for certain teachers. For example, public school classrooms are becoming more racially diverse, while the teaching force is becoming more homogenous. Also, the number of economically dis-

advantaged students and English language learners is on the rise and these students often require additional instructional services to succeed, thus boosting teacher demand. High rates of teacher turnover associated with teacher mobility and attrition across districts also drives demand higher, especially in urban and charter schools where many minority and poor students attend school.

Over on the supply side, there is clear evidence of a shrinking supply of new teachers coming from traditional supply sources. Some might argue that the labor market will adjust on its own to meet demand, but drop in new supply has been severe and sustained, suggesting that it might not be just a temporary market correction. Additionally, there is evidence of a mismatch between what subjects/classrooms future new teachers are being trained to teach and the needs of local schools. While Michigan has taken action to increase the supply of well-prepared teachers by opening up alternative pathways to the profession, these programs do not yet generate a large number new teachers. At the same time, a significant number of former teachers remains outside the workforce and could take up some of the slack in they re-enter the profession, but this potential source remains largely untapped. These broad trends and patterns suggest that policy interventions may be warranted.

Action is needed to ensure a robust, well-prepared teacher workforce now and into the future. Michigan could invest in rapidly building the supply of qualified teachers in the fields and locations where they are most needed, while creating incentives for experienced, effective teachers to re-enter and remain in the classroom. Additionally, it is abundantly important to this endeavor that Michigan invest in data, information, and analysis to diagnose workforce problems and guide the appropriate interventions.

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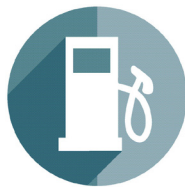
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