

Many school districts and states have long encouraged teachers to pursue graduate education. Teachers are frequently permitted to use graduate credits for recertification (Hill, 2007), and teachers with graduate degrees generally earn a higher salary or receive an annual stipend (Miller & Roza, 2012). Moreover, in some cases a master's degree is a requirement for teacher licensure. According to the 2015 data from the National Council on Teacher Quality, four states required a master's degree or its equivalent in coursework for professional licensure (Connecticut, Kentucky, Maryland, and New York), and four other states recommend a master's degree as a route to professional licensure (Massachusetts, Michigan, Missouri, and Oregon). A master's degree is also universally required for teacher licensure in thirteen countries, such as France, Spain, and Finland (World Policy Analysis Center, 2016). Advocates have argued that graduate education may improve teacher effectiveness (e.g., Harris & Sass, 2011) and raise the status of the teaching profession (e.g., Sahlberg, 2015). The purpose of this brief is to examine the prevalence of graduate degrees among teachers in the United States and to summarize research on the relationship between teacher educational attainment and student achievement.

PREVALENCE OF GRADUATE DEGREES AMONG TEACHERS

During 2011–12, 48 percent of teachers held a master's degree in U.S. public schools, and 9 percent of teachers held a doctoral degree (U.S. Department of Education, 2013). According to Table 1, the vast majority of master's degrees held by teachers were in the field of education. Only 8 percent of master's degrees were in administration.

MAIN FINDINGS

- Among early childhood, primary, middle, and junior high school teachers, those with a master's degree do not have a larger effect on student reading achievement, relative to teachers with only a bachelor's degree. The effect on student math achievement is unclear.
- The effect of master's degree attainment on student reading and math achievement during high school remains unclear. One study suggests that master's degree attainment will only yield a positive effect on student math achievement if the teacher majors in math during the master's degree program. Regarding science achievement, one study demonstrated that scores were higher among students whose teachers had a master's degree, relative to students whose teachers only had a bachelor's degree.
- Overall, past research depicts a complex, poorly understood relationship between teacher educational attainment and student outcomes that may vary by such factors as level of schooling, academic subject, and major-course congruence. Studies reporting non-significant or negative effects were most common in the context of reading achievement in K-8 schools. Additional research is needed to better inform state policy on teacher licensure requirements.

TABLE 1. Distribution of Master’s Degree Majors among Teachers during 2011-12 (n = 42,000)

Major	Percentage (%)
Elementary education	18.4
Special education	11.9
Other non-subject-matter-specific education	11.2
Secondary education	8.5
Administration	8.4
Reading	7.6
Early childhood or pre-K education	2.3
Music	2.2
Counseling and guidance	2.1
Physical education	1.9
Mathematics	1.9
Middle grades education	1.7
English	1.6
ESL or bilingual education	1.4
Industrial arts or technology education	1.4
Business management	1.4
Art or arts and crafts	1.4
Health education	1.3
Other (e.g., history, Spanish, biology, computer science)	13.6

Source: Authors’ analysis of the Schools and Staffing Survey (SASS), 2011-12.

STUDENT OUTCOMES RESEARCH

Past research has indicated that the effects of having a master’s degree (relative to only a bachelor’s degree) on student achievement partly vary by the level of schooling and academic subject (Goldhaber, 2015) as well as the congruence between the major field of study and the teacher’s classroom subject matter (Hill, 2007).¹ Researchers have examined teacher effectiveness in early childhood and primary schools, middle and junior high schools, and high schools. Student academic achievement has been most commonly measured in the areas of reading and math.

In early childhood and primary schools (pre-kindergarten through grade 6), teachers with a master’s degree relative to only a bachelor’s degree have not had a greater influence on

student reading achievement (Betts, Zau, & Rice, 2003; Collier, 2013; Croninger, Rice, Rathbun, & Nishio, 2007; Dee, 2004; Harris & Sass, 2011; Henry, Bastian, Fortner, Kershaw, Purtell, Thompson, & Zulli, 2014; Jepsen, 2005; Rivkin, Hanushek, & Kain, 2005). However, studies examining the effect of teacher educational attainment on student math achievement in K–6 schools have yielded mixed results. Four studies found that math achievement scores of students whose teachers had a master’s degree were significantly higher than those of students whose teachers did not have a master’s degree (Betts et al., 2003; Dee, 2004; Collier, 2013; Ferguson & Ladd, 1996). For example, using data from the Early Childhood Longitudinal Study in a student fixed effects model, Collier (2013) found first through third graders’ math achievement scores to be positively associated with teachers’ attainment of a master’s degree in early childhood education but not a master’s degree in other fields. On the contrary, five studies failed to detect a significant relationship between students’ math achievement and their teachers’ educational attainment level (Croninger et al., 2007; Harris & Sass, 2011; Henry et al., 2014; Jepsen, 2005; Rivkin et al., 2005).

Similar to the findings in early childhood and primary schools, teacher educational attainment has been unassociated with the reading achievement scores of seventh- and/or eighth-grade students (Betts et al., 2003; Henry et al., 2014). Moreover, the effect of teachers with a master’s degree on student math achievement remains contested at the middle school level. Some studies have found a non-significant (Betts et al., 2003; Hanushek, Kain, O’Brien, & Rivkin, 2005) or negative effect (Henry et al., 2014) on math achievement, whereas Harris and Sass (2011) found that teachers’ master’s degree attainment was positively associated with gains in mathematics achievement among sixth-through eighth-grade students in North Carolina.

Finally, research on the effect of master’s degree attainment in high school (Grades 9–12) has yielded inconsistent results. Betts et al. (2003) observed a positive association between teachers’ attainment of a master’s degree and student reading achievement in San Diego. Conversely, Henry et al. (2014) found that English achievement scores did not differ between students with teachers who held a master’s degree and those with teachers who held other types of degrees. Only one study examined the effect of teachers with a master’s degree on science achievement scores, revealing a significant positive association (Henry et al., 2014). Regarding

¹ Studies were selected for this review if a rigorous statistical analysis was employed to minimize the influence of confounding factors, including fixed effects models and traditional regression with key covariates. Although these studies do not provide the same level of confidence in causal attribution as do experimental designs, they currently provide our best estimates of teacher effectiveness.

student math achievement, both Betts et al. (2003) and Henry et al. (2014) reported a non-significant effect of teacher educational attainment. However, Goldhaber and Brewer (2000) demonstrated that such null effects may be partly attributed to a failure to account for the congruence (or lack thereof) between the master's degree major and the teacher's classroom subject matter. Using data from the National Educational Longitudinal Study of 1988, they found that high school students taught by teachers with master's degrees in mathematics had significantly higher math achievement scores than students taught by teachers without a master's degree or with out-of-subject degrees.

Researchers have also failed to detect significant effects when using combined subject test scores in middle and high schools (Clotfelter et al., 2010; Ladd & Sorenson, 2015) and social studies achievement scores in high school (Henry et al., 2014). For example, Ladd and Sorensen (2015) examined the effectiveness of teachers with and without a master's degree on middle- and high-school students' achievement scores in North Carolina. Ladd and Sorensen used the End of Grade (EOG) and End of Course (EOC) standardized test scores, which are composites of standardized test scores including English, science, and math. They found that the composite scores of both middle and high school students whose teachers held a master's degree were not significantly different from the scores of students whose teachers did not hold a master's degree. Given the seeming heterogeneity of effects by subject matter, inferences drawn from studies using combined test scores should be interpreted with caution.

SUMMARY

States and school districts frequently promote graduate education as a means of improving teacher effectiveness, though this approach is not uniformly efficacious. Overall, past research depicts a complex, poorly understood relationship between teacher educational attainment and student outcomes that may vary by such factors as level of schooling, academic subject, and major-course congruence. Studies reporting non-significant or negative effects were most common in the context of reading achievement in K-8 schools. The effects of a teacher having a master's degree on math achievement were mixed at each school level. Two studies indicated that master's degree attainment will only yield a positive effect on student math

achievement if the teacher obtains a graduate major in a specific field (e.g., math). Master's degree attainment was positively associated with student achievement in high school science, but only one study examined this relationship. Other potential sources of variance include the state or school district under study, the quality of the graduate program, the field of study (e.g., administration, education), the type of course taught (e.g., dual enrollment), and the statistical model utilized.

Less is known about how graduate education affects teacher professional status, morale, and retention, which may indirectly influence student outcomes (e.g., Klassen & Tze, 2014; Ronfeldt, Loeb, & Wyckoff, 2012). For example, Sahlberg (2015) argued that the master's degree requirement in Finland has helped to attract highly talented and motivated individuals to the teaching profession by raising the professional status of teaching and expanding opportunities beyond the classroom, including educational administration, training-related jobs in the private sector, and doctoral studies. Additional research is needed in both of these dimensions – student and teacher outcomes – to better inform state policy on teacher licensure requirements.

REFERENCES

- Betts, J. R., Zau, A., & Rice, L. (2003). *Determinants of student achievement: New evidence from San Diego*. San Francisco, CA: Public Policy Institute of California.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2010). Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects. *The Journal of Human Resources*, 45(3), 655-681.
- Collier, T. (2013). Teacher qualifications and student achievement: A panel data of analysis. *Economics and Finance Faculty Publications*, Paper 6. Retrieved from http://ecommons.udayton.edu/eco_fac_pub/6
- Croninger, R. G., Rice, J. K., Rathbun, A., & Nishio, M. (2007). Teacher qualifications and early learning: Effects of certification, degree, and experience on first-grade student achievement. *Economics of Education Review*, 26(3), 312-324.
- Dee, T. S. (2004). Teachers, race, and student achievement in a randomized experiment. *Review of Economics and Statistics*, 86(1), 195-210.
- Ferguson, R. F., & Ladd, H. F. (1996). How and why money matters: An analysis of Alabama schools. In H. F. Ladd (Ed.), *Holding schools accountable: Performance-based reform in education* (pp. 265-298). Washington, DC: Brookings Institute.
- Goldhaber, D. D., & Brewer, D. J. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis*, 22(2), 129-145.
- Goldhaber, D. (2015). Teacher effectiveness research and the evolution of U.S. teacher policy. Retrieved from <http://gwbcenter.imgix.net/Resources/gwbi-teacher-effectiveness-research.pdf>
- Hanushek, E. A., Kain, J. F., O'Brien, D. M., & Rivkin, S. G. (2005). The market for teacher quality. Cambridge, MA: National Bureau of Economic Research.
- Harris, D. N., & Sass, T. R. (2011). Teacher training, teacher quality and student achievement. *Journal of Public Economics*, 95(7), 798-812.
- Henry, G. T., Bastian, K. C., Fortner, C. K., Kershaw, D. C., Purtell, K. M., Thompson, C. L., & Zulli, R. A. (2014). Teacher preparation policies and their effects on student achievement. *Education Finance and Policy*, 9(3), 264-303.
- Hill, H. C. (2007). Learning in the teaching workforce. *The future of children*, 17(1), 111-127.
- Jepsen, C. (2005). Teacher characteristics and student achievement: Evidence from teacher surveys. *Journal of Urban Economics*, 57(2), 302-319.
- Klassen, R. M., & Tze, V. M. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review*, 12, 59-76.
- Ladd, H. F., & Sorensen, L. C. (2015). Do Master's Degrees Matter? Advanced Degrees, Career Paths, and the Effectiveness of Teachers. Washington, DC: CALDER.
- Miller, R., & Roza, M. (2012). The sheepskin effect and student achievement: de-emphasizing the role of master's degrees in teacher compensation. Washington, DC: Center for American Progress.
- National Council on Teacher Quality (2015). 2015 State teacher policy yearbook. Retrieved from http://www.nctq.org/dmsView/2015_State_Teacher_Policy_Yearbook_National_Summary_NCTQ_Report
- Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417-458.
- Ronfeldt, M., Loeb, S., & Wyckoff, J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal*, 50(1), 4-36.
- Sahlberg, P. (2015). *Finnish lessons 2.0: What can the world learn from educational change in Finland?* New York, NY: Teachers College Press.
- U.S. Department of Education (2013). Preparing and credentialing the nation's teachers: The Secretary's ninth report on teacher quality. Retrieved from <http://www2.ed.gov/about/reports/annual/teachprep/index.html>

World Policy Analysis Center. (2016). *Quality of teacher preparation*. Retrieved from <http://worldpolicycenter.org/topics/education/quality-of-teacher-preparation/policies>



105 Fifth Avenue South, Suite 450
Minneapolis, MN 55401
612-677-2777 or 855-767-MHEC
www.MHEC.org | mhec@mhec.org

Midwestern Higher Education Compact (MHEC)

A nonprofit regional organization assisting Midwestern states in advancing higher education through interstate cooperation and resource sharing. MHEC seeks to fulfill its interstate mission through programs that expand postsecondary opportunity and success; promote innovative approaches to improving institutional and system productivity; improve affordability to students and states; and enhance connectivity between higher education and the workplace.

Compact Leadership, 2016-17

Chair

Mr. Richard Short, Kansas
Governor's Designee

Vice-Chair

Mr. Tim Flakoll, Provost,
Tri-College University

Treasurer

Dr. Ken Sauer, Senior
Associate Commissioner
and Chief Academic
Officer, Indiana
Commission for
Higher Education

Past Chair

Mr. David Pearce,
Former State Senator,
Missouri General Assembly

President

Mr. Larry Isaak

© COPYRIGHT 2017 MIDWESTERN HIGHER EDUCATION COMPACT.

*The Impact of Graduate Education on Teacher Effectiveness:
Does a Master's Degree Matter?*

MHEC
RESEARCH BRIEF