

The Long and Winding Road: Mapping the College and Employment Pathways to Teacher Education Program Completion in Washington State

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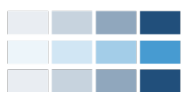
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Abstract

Nationally, more than 75% of individuals who are credentialed to teach are prepared in traditional college- or university-based teacher education programs (TEPs). But the college and employment pathways that prospective teachers take to TEP enrollment and completion have not been comprehensively examined. A better understanding of how credentialed individuals find their way into TEPs helps us understand the sources of new teacher supply early in the prospective teacher pipeline. With that in mind, we analyze pathways into and through TEPs using historical postsecondary and unemployment insurance data from Washington state. We find that the pathways are quite varied with around 40% of bachelor's-level TEP completers spending at least some time in community colleges and less than 40% enrolling and finishing at the same university directly after high school. Pathways to master's TEP completion are even more varied, with almost half of the completers having prior employment experience. For researchers, this varied landscape raises important questions about the relationship between pathways, candidate persistence, and eventual job performance. For policymakers, the results suggest that efforts to recruit the next generation of teachers need to look beyond the pool of students already enrolled at a 4-year university to include students at 2-year colleges or in the labor force who might be interested in entering a TEP.

1. Introduction

Teacher shortages are a pressing education policy concern, as highlighted by a recent \$2.6 billion initiative from the U.S. Department of Education to “prepare, support, and retain high-quality educators” with the goal of “eliminating the teacher shortage” (Cardona, 2023). There is also concern that the prestige of the teaching profession has been sliding; in 2018, for instance, polling indicated that, for the first time, a majority of parents stated that they did not want their children to pursue teaching as a career (PDK International, 2018). High-profile efforts to attract teachers include the introduction of alternative pathways to teacher certification, the removal in some states of requirements such as licensure tests and field-based experiences viewed as “barriers to entry” to the teaching profession, and extensive public-relations campaigns designed to bring aspiring teachers into the workforce (like the “Teach Washington” campaign in Washington State, the setting of this study).

But even as such changes take place across the country, there is little doubt that the backbone of the teaching profession continues to be graduates of traditional, university-based teacher education programs (TEPs). As of 2020–21 (the most recent year of Title II data), among those entering the teacher workforce nationwide the share of traditional program completers was 76 percent.¹ This reliance on university programs has been particularly true in Washington, which until 2018–19 had no alternative paths to certification outside of accredited universities and where more than 95 percent of new in-state credentials originated from university-based TEPs. Figure 1, for example, shows that of all credentialed individuals in categories not listed as

¹ See the “Completers, by state, by program type” file located at <https://title2.ed.gov/Public/DataTools/Tables.aspx>. Additionally note that the most recent Title II report (U.S. Department of Education, Office of Postsecondary Education 2022) shows that between 2012–13 and 2018–19, the percentage of individuals who took alternative routes to certification as a share of people preparing to teach increased from 15% to 23% (author’s calculation based on Table S1.4).

Out of State, less than 5% obtained credentials from a 2-year college, an Educational Service District, or a Tribal school. Efforts to influence the number or composition of teachers early in the teacher pipeline should be informed by a thorough understanding of the pathways that teacher candidates typically take to TEP completion.² This is an area where our knowledge base is quite thin, in large part due to severe data limitations about individuals before they receive a teaching credential—the early teacher pipeline (Goldhaber & Holden, 2021; Kraft & Lyon, 2022). Moreover, the limited evidence on preservice teacher pathways, discussed in the next subsection, is focused mostly on progression *through* various stages of the preparation/licensure process (e.g., Bartanen & Kwok, 2022; Kilbride et al., 2023; Rucinski & Goodman, 2019) rather than progression *from* specific educational and employment experiences. We discuss this existing research in the next subsection.

1.1 Background

Concern over teacher shortages—whether argued to be massive and widespread (Berry & Shields, 2017; Sutcher et al., 2019) or concentrated in hard-to-staff subject areas and grade levels (Cowen et al., 2016; McVey & Trinidad, 2019)—is not new. Nor are shortages an isolated measure of the declining health of the teaching profession. Indeed, recent research has found that related factors—such as interest in becoming teachers by high school seniors and college freshmen, the number of new entrants into the profession, teachers’ professional prestige, and teachers’ job satisfaction—are at or near historically low levels (Kraft & Lyon, 2022).

Policy solutions that focus on increasing teacher supply are many and varied. For example, strategies such as reducing barriers to entry (e.g., alternative routes to certification, loan

² There is evidence, for example, that diversifying the teacher workforce with a focus on attracting candidates of color and high-quality candidates could have positive effects on various student outcomes—especially for students of color (Goldhaber et al., 2019).

forgiveness); improving teacher working conditions (e.g., more autonomy, opportunities for advancement, on-the-job support); and increasing teacher compensation are intended to lure potential candidates into teaching (for a review, see Podolsky et al., 2019). These remedies, however, are intended to alleviate certain pinch points in the teacher pipeline that are “downstream” from initial interest in teaching—that is, they are aimed at either enticing people who have enough of an interest in teaching to pursue it as a profession or retaining existing teachers.

Moreover, most research on teacher supply is based on people who already have committed to teaching as evidenced by their being enrolled in a TEP (Bartanen & Kwok, 2022; Goldhaber et al., 2014; Goldhaber et al., 2020; Vagi et al., 2019). And although TEPs are a critical part of the teacher pipeline, research is lacking on the earlier part of it when it comes to understanding what attracts people to the profession in the first place.

One crucial limitation to such investigations is the lack of available data able to connect one’s interest in teaching and their potential future teaching outcomes. One exception is Hanushek and Pace’s examination (1995) of high school seniors from 1980 using the High School and Beyond survey. A more recent example is Bartanen and Kwok’s study (2022) using admissions data (which includes information about a student’s intention to pursue teacher certification) and TEP records from one public university in Texas to look at the pipeline into TEPs and examine those who expressed interest in becoming a teacher, those who entered the TEP, and those who eventually entered the profession. Likewise, recent work from Massachusetts (Rucinski & Goodman, 2019) and Michigan (Kilbride et al., 2023) track potential teachers through various stages of the preparation and licensure pipeline and document specific pinch points for overall teacher supply and teacher workforce diversity in particular.

1.2 Research Questions

This study complements Bartanen and Kwok’s work (2022) most closely in that we too look at the early teacher pipeline into TEPs. However, instead of following high school students forward from “interest to entry” within a single institution, we look back for samples of graduates from an entire state who earned degrees in education to see what types of institutions they came from before they entered the TEP from which they eventually graduated. We contend that this is an overlooked yet important part of the early teacher pipeline because such information can inform early recruitment efforts into teaching. Programs like “Troops to Teachers” and “Grow Your Own,” for example, have shown targeted recruitment efforts to be an effective strategy for solving teacher shortages and increasing the diversity of the pipeline (General Accounting Office, 2001, 2006; Gist et al., 2019; Owings et al., 2015).

We use historical postsecondary and unemployment insurance data from Washington state to study the pathways into and through TEPs and show how credentialed individuals progressed through their high school, college, and employment histories toward completing such programs in the state. To this end, we attempt to answer the following questions:

1. What college pathways did credentialed individuals take on their way to earning their teaching credential?
2. How do these college pathways differ across education level (bachelor’s versus master’s degrees) and teaching endorsements?

2. Method

2.1 Policy Context

Since teacher preparation and licensure are state functions, it is not surprising to see the teacher preparation infrastructure differ across states. In Washington state, several aspects of this infrastructure are worth noting. First, Washington relies heavily on traditional routes to teacher

certification. During the years we examine (2014–2017), Washington state had TEPs in eight public and 14 private institutions of higher education (IHEs), a ratio that mirrored the national average.³ Although between seven and 10 of these IHEs offered alternative routes to certification during the years we study, fewer than six percent of graduates came through an alternative IHE-based route in any given year.⁴ Notably, no non-IHE-based alternative routes were offered in the state during this time period.

Second, although Washington state had more than twice as many private TEPs than public ones, much like the country as a whole, more than half of individuals credentialed in-state came from public TEPs (between 52% and 62%) in any given year (see Figure 1).⁵ On a related note, since this study only examines graduates from public institutions in Washington state, it does not consider those who were credentialed outside the state (between 41% and 49% for our time period).⁶

Third, Washington’s articulation agreements—like those in most states—aim to smooth transitions that students make between the state’s community/technical colleges and 4-year universities. This means, for example, that such institutions have agreed upon which lower division courses are equivalent to a year’s worth of general education credits and that such credits would be accepted at any transferring 2- or 4-year institution within the state. It also

³ 2015 is the most recent school year for which a crosswalk between programs listed in Title II and the Integrated Postsecondary Education Data System (IPEDS) is available (see: <https://title2.ed.gov/Public/DataTools/Files.aspx>). In that year, only 79% of the programs listed in Title II could be matched to IPEDS. Of those, 62% were private and 38% were public institutions.

⁴ Based on Title II annual state reports (see <https://title2.ed.gov/Public/Home.aspx>).

⁵ Merged Title II and IPEDS data from 2015 show that a national average of 66% of program completers came from public TEPs while 34% came from private TEPs.

⁶ This estimate of out-of-state individuals in Washington state is larger than we have reported previously. Per Goldhaber et al. (2012), 22% of certified teachers came from outside Washington. That study focused on fourth- and fifth-grade teachers for whom we could estimate value-added measures. In contrast, **Figure 1** includes all credentialed individuals regardless of whether they were teachers. The difference in these percentages is reasonable, since people credentialed outside the state are less likely to appear as teachers and less likely still to appear as fourth- or fifth-grade teachers—areas of the least shortages in the state.

means that anyone who earned an associate degree from a 2-year college would effectively enter a 4-year institution as a junior.

2.2 Data

Our main sources of data are provided by Washington state’s Education Research and Data Center (ERDC) which administers the Public Centralized Higher Education Enrollment System (PCHEES). PCHEES records students’ last (i.e., graduating) high school and their post-secondary academic histories at 2- and 4-year public institutions within the state. ERDC also maintains employment records for those covered by Washington state’s unemployment insurance (UI) program, which covers all workers in the state except the self-employed and federal workers.⁷ We use these data to identify two groups of people: (a) those employed by the public K-12 education system and (b) those employed outside of it.

Finally, we incorporate two other sources of data from Washington’s Office of the Superintendent of Public Instruction (OSPI). First, we use the S-275, an annual reporting system that collects employment data for all public school employees in the state who were employed as of October 1 of each school year. The S-275 data allow us to create indicators for whether someone was in a teaching position or other position requiring certification on that date in each year. Thus, for those individuals we identify (from UI data) as being employed inside K-12 education, we can further parse out those who were employed as teachers. Second, OSPI collects endorsement data which we use to identify which endorsement(s)—indicating which grades and subject areas individuals are deemed credentialed to teach – were obtained by individuals with a teaching credential.

⁷ Independent contract workers—those not covered by UI—are a small but growing part of Washington state’s workforce. For more details, see Goldhaber et al. (2022).

We received PCHEES and UI data spanning the 2007–08 through 2016–17 school years. To ensure that we observe at least six years of data prior to each candidate’s completion of a TEP, we focus on a sample of 3,605 unique credentialed individuals who graduated with a bachelor’s ($n = 2,510$) and/or master’s degree ($n = 1,103$) in education from one of the 4-year public universities in Washington state between 2014 and 2017.⁸ Importantly, because the ERDC data are restricted to individuals who earned a teaching credential and are then merged to college enrollment and employment data, we are unable to include people in our sample who started down a particular pathway and then dropped out before graduating from a TEP. In building the dataset, for each credentialed individual we look back six years prior to their graduation and annually observe where they were enrolled (i.e., public high school, public 2-year college, public 4-year university) and whether they were employed (i.e., at all; or as a teacher, as a nonteacher in education, or outside education)⁹. Hence, we construct a lengthy retrospective picture of the pathways that credentialed individuals took on their way to graduating from a TEP and receiving their initial teaching credential.¹⁰

3. Results

3.1 Prior Pathways by Degree Type

In Figure 2, we report the educational enrollment or employment status for individuals in the sample described in the previous section *1 year prior to entering* their degree-granting

⁸ Eight people in our sample earned a bachelor’s and master’s degrees during the time period we analyze. Although we report outcomes for grouped years (2014–2017), results are similar in any given year. Master’s completers may be a combination of people who earned an initial credential and those who returned to school to add a degree or an endorsement.

⁹ In this context active enrollment is a mutually exclusive category to actively working. That is, we consider a person’s annual employment status only after they are known to not be enrolled in any high school or college.

¹⁰ Because the step between graduating from a TEP and obtaining an initial teaching credential is nominal (i.e., a background check by the state education office) and our sample only includes credentialed individuals whom we know (retrospectively) were graduates from public TEPs, we use the terms “graduates” and “credentialed individuals” interchangeably.

undergraduate or graduate program. For bachelor's graduates, these statuses include: being enrolled in a public high school, a 2-year college, or a 4-year university different from the one where they were degreed; being employed as a teacher, a nonteacher within the K–12 system or outside of education; or being unobserved in the data. Master's-level graduates are sorted into an additional category, i.e., having just graduated from an undergraduate program in Washington state.

For graduates completing a TEP with a bachelor's degree (Panel A), the most common prior status was enrollment in high school in Washington, which represents about 40% of the sample. A similar percentage were enrolled in a 2-year college immediately prior to enrolling in the institution from which they received their teaching credential. A small percentage (6.5%) were enrolled in a different 4-year institution from where they eventually earned their credential. And an equally small percentage (6.7%) were employed outside of education with an even smaller percentage (1.9%) employed in the K–12 system, likely as paraeducators. A final group is missing (7.4%) but consists of some combination of individuals who moved to Washington to begin their 4-year program, lived in the state but attended a private college, were unemployed, or were employed in a sector not captured by the UI data.

Unsurprisingly, the prior statuses of students in master's programs (Panel B) differed from those who were earning their undergraduate degrees. For instance, compared to bachelor's graduates, only one quarter as many (9.9%) were enrolled in 2-year colleges (and of course no master's graduates were enrolled in high school immediately prior to entering their master's program). Three out of 10 master's graduates came directly from an undergraduate program. Instead, many master's students (43.5%) entered their credentialing institution directly from the labor market, and percentages were nearly evenly split between having been employed as

teachers (14.1%), as nonteachers within education (14.8%), or outside of education entirely (14.6%). Finally, nearly twice as many master's graduates (15.7%) as bachelor's graduates (7.4%) were unobserved in our data.

3.2 *Prior Statuses by Degree and Endorsement*

To examine how college pathways differ by the type of teaching endorsement graduates obtained, we group endorsements into four categories: Science, Technology, Engineering, and Math (STEM); Special Education (SPED); Elementary Education (ELEM); and all other endorsements (other). We create mutually exclusive categories so that each person has a single endorsement by prioritizing STEM, then SPED over ELEM, and then other endorsements.¹¹ Figure 3 replicates Figure 2 and groups students into the endorsement areas they earned when first certified as teachers. Interestingly, for students who earned a bachelor's degree, higher percentages of STEM (43.5%) and SPED (44.4%) teachers went straight from their experiences as high school students into their education program compared to those who earned an elementary endorsement (37%). In contrast, those who earned an elementary endorsement were 1.3 times more likely to have attended a 2-year college immediately before entering their education program than candidates with endorsements in other fields.

The pathways for master's candidates also differ by endorsement. SPED-endorsed teachers were much more likely (between 1.5 and 3.2 times) to have worked as a teacher or to have been employed in education as a nonteacher (between 1.6 and 1.9 times) than those in other

¹¹ There is considerable overlap between holding a STEM or SPED endorsement and an ELEM endorsement. Indeed, 63% of people with a STEM endorsement and 75% of those with a SPED endorsement also held an ELEM endorsement. Individuals with dual endorsements were coded prioritizing their STEM and SPED endorsements. For example, people with both a STEM and an ELEM endorsement were coded as STEM-endorsed. Individuals with both a SPED and an ELEM endorsement were coded as SPED-endorsed. Thus, those we categorize as ELEM-endorsed do not reflect all ELEM-endorsed individuals, but those who had an ELEM endorsement only. The 8 people with both STEM and SPED endorsements were coded as STEM-endorsed. The percentages of individuals by endorsement area are: STEM (10.4%), SPED (14.7%), ELEM (65.2%) and other (9.6%).

fields. Interestingly, the “other-” endorsed master’s students were more likely to have arrived in their program directly from their bachelor’s program (by between 1.3 and 2.4 times) than were those in other fields.

3.3 *Annual Transitions Prior to Credential*

An alternative way of analyzing pathways is to use a Sankey diagram to show graduates’ transitions between education and employment categories over time as they progress toward graduation and their initial teaching credential. In Figures 4 and 5, we plot statuses for the 6 years prior to each candidate’s graduation from a public 4-year university with a bachelor’s or master’s degree between 2014 and 2017. The stacked bars for each year represent the percentage of candidates who were observed in each category for each of the 6 years before graduation, whereas the width of the path between each segment of the stacked bars represents the percentage of candidates who transitioned between the different categories from year to year.¹²

Consider Figure 4, which presents bachelor’s-level graduates. We track this group over time for the same categories we discussed above except that we collapse employment into to a dichotomous category (employed versus not employed) and include a category indicating whether a person is enrolled in the same four-year university from which they graduated. The right-hand column consists of all, or 100%, of the 2,510 candidates who received their bachelor’s degree between 2014 and 2017.

Moving to the left, one can trace the histories of what people in this group were doing each year prior to graduation. Unsurprisingly, the year before graduating, most graduates were enrolled in the program from which they ultimately graduated. However, continuing to move

¹² Note that in **Figures 4 and 5**, the percentages across the categories in some years do not sum to 100. There were several year-to-year transitions taken by 10 or fewer individuals which we have omitted from the plots. However, the percentages shown in each category in a given year are reflective of all individuals in that category even if they entered that category via a transition that was omitted due to its size.

back in time (i.e., moving to the left in the figure), one can see substantial flows of high school students into either their ultimate bachelor's program or into 2-year programs that transitioned into bachelor's programs. At the 6-year mark (the left column) 58% of students were in high school. The majority of the remaining students were in education programs—mostly 2-year programs—whereas only 10% were employed. Four years before graduation, in what would typically be considered one's freshman year, equal percentages of students were attending the university from which they would graduate (34%) and either a 2-year college (30%) or a different 4-year university than the one from which they would eventually graduate (4%).

In Figure 5, we show a Sankey diagram for MA-earners. The categories shown are similar to those discussed above with one exception—to reduce unnecessary complexity, we group all of the academic institutions where a person was enrolled and all of the sectors in which they were employed *before* earning their bachelor's into a single category (i.e., “pre-BA” statuses). As in Figure 4, the right-hand column of Figure 5 consists of all of the 1,103 candidates who earned their master's degree between 2014 and 2017. Because master's programs are much shorter in length than bachelor's programs (typically 1 year), we see transitions to one's graduating institution generally occurred much later, i.e., closer to graduation, than for bachelor's candidates. Indeed, nearly all (90%) of the initial transitions into one's graduating master's institution occurred in the two years before graduation.

On average during the two years before graduation, as a share of initial transitions into one's graduating institution, more master's graduates came from an unobserved category (15%) than did those who pursued a bachelor's degree (3%) while a smaller share came from a 2-year college (11% versus 80% for bachelor's graduates). Yet, on average, during those two years, over half of all initial transitions into one's graduating TEP were made by individuals coming

from the labor market (i.e., 64% two years before and 47% one year before graduation). Thus, although bachelor's candidates tended to enter their degree-granting institutions earlier (3 and 5 years before graduation) from either high school or a 2-year college, master's candidates tended to enter later (1 to 2 years before graduation) from bachelor's programs or from the labor market.

4. Discussion

4.1 *Overview of Findings*

In summary, we find that less than 40% of graduates from bachelors-level TEPs took a “direct” path to TEP completion, meaning that they went directly from high school to the university from which they completed a TEP. Likewise, almost 40% spent some time in a 2-year community college. Six percent transferred from another 4-year university, 8% entered their university from prior employment, and 7% came from out of state. Pathways are even more varied for master's-level TEP completers: 10% took 2-year college coursework prior to program entry, 45% came from prior employment, 30% came directly from receiving a bachelor's degree, and 16% came from out of state.

We also document substantial variation across endorsement areas within degree types. Among bachelor's graduates, those with an elementary endorsement were more likely to have entered their TEP institution from a 2-year college, whereas those with a SPED or STEM endorsement were more likely to have come directly from high school and those with an “other” endorsement were more likely to have come from the labor market. Among master's graduates, those with a special education endorsement were more likely than any other endorsement group to have entered their TEP institution directly from the labor market, three-quarters of whom had worked in education the previous year. Those with any other endorsement were more likely to have come directly from a bachelor's program, especially those with an “other” endorsement.

4.2 *Limitations*

Given state-to-state variation in educational infrastructure—e.g., relative enrollments in public and private colleges, the prevalence of 2-year colleges, articulation agreements, and reliance on traditional versus alternative routes of teacher preparation and licensure—the findings in this study may not generalize to other states. Even within Washington state, we cannot assess the landscape for all TEP graduates since our sample is limited to those from public TEPs. What is more, within our sample we cannot observe the educational or employment histories of those who were enrolled or employed outside of Washington state before entering their graduating institution. Nor can we follow individuals forward in time from when they began a particular pathway because our sample is limited to credentialed individuals for whom we can only construct a retrospective picture. Lastly, the timing of this study predates the implementation of non-IHE alternative routes to gaining a teaching credential in the state as well as a global pandemic—both of which have seriously impacted various aspects of teacher preparation and the teaching profession. These are all fertile grounds for future research.

4.3 *Policy Implications*

First, our research highlights the need for data partners to redefine or clarify definitions of college pathways to certification since current definitions (e.g., alternative, residency, apprenticeship) do not clearly reflect the variety of pathways we have documented in this analysis. Such changes could make it easier for researchers to track pathways more accurately and to provide continuous, consistent, coherent feedback to data partners as they implement various supports to program development along the teacher pipeline.

Second, our research suggests we ought to expand our understanding of teacher shortages to include “upstream” as well as “downstream” solutions. That is, policies should be designed to

attract as well as “prepare, support, and retain high-quality educators” (Cardona, 2023). And while other researchers have pointed out that TEPs could rather easily emphasize recruiting from within their college or university (Bustos Flores et al., 2007), we add that TEPs should go one step further back in the pipeline to recruit people from junior colleges especially in places—like Washington State—where a large proportion of people who ended up graduating from TEPs flowed through such colleges.

Furthermore, designing *targeted* recruitment plans based on past trends in how TEP graduates moved through college or employment to become credentialed could be used to address specific subject-area shortages. Just as any angler worth their salt knows that you don’t fish for pike in the ocean or for tuna in the river, having information on graduates’ pathways to TEP completion could help education policymakers determine where to focus recruitment efforts. For example, this study suggests that (at least in Washington state) efforts to recruit more master’s-level special education teachers may prove most efficient when directed at people in the labor market, especially those already employed in the field of education.

Lastly, since there is some evidence that many students who start college in an education major end up in teacher education and that navigating an efficient path to certification is often difficult (Bartanen & Kwok, 2022), any recruitment efforts ought to be buttressed by support from TEPs to ease students’ path to certification and the teacher workforce. Targeted recruitment at the beginning stages of students’ college careers alongside TEP support could ignite an early interest in teaching as a profession as well as increase the number of people who enroll in teacher preparation programs and eventually become credentialed as teachers.

References

- Bartanen, B., & Kwok, A. (2022). Examining clinical teaching observation scores as a measure of preservice teacher quality. *American Educational Research Journal*, 58(5), 1–33.
- Berry, B., & Shields, P. M. (2017). Solving the teacher shortage: Revisiting the lessons we've learned. *Phi Delta Kappan*, 98(8), 8–18.
- Bustos Flores, B., Clark, E. R., Claeys, L., & Villarreal, A. (2007). Academy for Teacher Excellence: Recruiting, preparing, and retaining Latino teachers through learning communities. *Teacher Education Quarterly*, 34(4), 53–69.
- Cardona, M. (2023, January 24). *Remarks by U.S. Secretary of Education Miguel Cardona on Raise the Bar: Lead the World* [Press Release]. U.S. Department of Education. <https://www.ed.gov/news/speeches/remarks-us-secretary-education-miguel-cardona-raise-bar-lead-world>
- Cowen, J., Goldhaber, D., Hayes, K., & Theobald, R. (2016). Missing elements in the discussion of teacher shortages. *Educational Researcher*, 45(8), 460–462.
- General Accounting Office. (2001). *Troops to Teachers: Program helped address teacher shortages* (GAO-01-567).
- General Accounting Office. (2006). *Troops to Teachers: Program brings more men and minorities to the teaching workforce, but education could improve management to enhance results* (GAO-06-265).
- Gist, C., Bianco, M., & Lynn, M. (2019). Examining grow your own programs across the teacher development continuum: Mining research on teachers of color and nontraditional educator pipelines. *Journal of Teacher Education*, 70(1), 13–25.
- Goldhaber, D., & Holden, K. (2021). The early teacher pipeline: What data do—and don't—tell us. *Phi Delta Kappa*, 103(3), 13–16.
- Goldhaber, D., Krieg, J., Liddle, S., & Theobald, R. (2022). Out of the gate, but not necessarily teaching: A descriptive portrait of early-career earnings for those who are credentialed to teach. *Education Finance and Policy*, 1–25.
- Goldhaber, D., Krieg, J., & Theobald, R. (2014). Knocking on the door to the teaching profession? Modeling the entry of prospective teachers into the workforce. *Economics of Education Review*, 43, 106–124. <https://doi.org/10.1016/j.econedurev.2014.10.003>
- Goldhaber, D., Krieg, J. M., Theobald, R., & Goggins, M. (2020). Front end to back end: Teacher preparation, workforce entry, and attrition. *Journal of Teacher Education*, 73(3), 253–270.

- Goldhaber, D., Liddle, S., & Theobald, R. (2013). The gateway to the profession: Assessing teacher preparation programs based on student achievement. *Economics of Education Review*, 34, 29–44.
- Goldhaber, D., Theobald, R., & Tien, C. (2019). Why we need a diverse teacher workforce. *Phi Delta Kappan*, 100(5), 25–30.
- Hanushek, E. A., & Pace, R. R. (1995). Who chooses to teach (and why)? *Economics of Education Review*, 14(2), 101–117.
- Kilbride, T., Strunk, K. O., Rogers, S., & Wasif, U. (2023). *Tracking progress through Michigan's teacher pipeline*. Education Policy Innovation Collaborative at Michigan State University.
- Kraft, M. A., & Lyon, M. A. (2022). *The rise and fall of the teaching profession: Prestige, interest, preparation, and satisfaction over the last half century* (EdWorkingPaper No. 22-679). Annenberg Institute at Brown University.
- McVey, K. P., & Trinidad, J. (2019). *Nuance in the noise: The complex reality of teacher shortages*. Bellwether Education Partners.
- Owings, W. A., Kaplan, L. S., Khrabrova, I., & Chappell, S. (2015). Troops to Teachers update: Changing, but still pleasing principals with high teaching quality. *NASSP Bulletin*, 99(1), 70–98.
- Podolsky, A., Kini, T., Darling-Hammond, L., & Bishop, J. (2019). Strategies for attracting and retaining educators: What does the evidence say? *Education Policy Analysis Archives*, 27(38).
- Rucinski, M., & Goodman, J. (2019). *Racial diversity in the teacher pipeline: Evidence from Massachusetts* (Policy Brief). Harvard Kennedy School, Rappaport Institute for Greater Boston.
- Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2019). Understanding teacher shortages: An analysis of teacher supply and demand in the United States. *Education Policy Analysis Archives*, 27(35). <https://doi.org/10.14507/epaa.27.3696>
- U.S. Department of Education, Office of Postsecondary Education. (2022). *Preparing and credentialing the nation's teachers: The secretary's report on the teacher workforce*. <https://title2.ed.gov/Public/OPE%20Annual%20Report.pdf>
- Vagi, R., Pivovarova, M., & Barnard, W. M. (2019). Keeping our best? A survival analysis examining a measure of preservice teacher quality and teacher attrition. *Journal of Teacher Education*, 70(2), 115–127.

Figures and Tables

Figure 1. Number of Initially Certificated Individuals from Various Credentialing Sources in Washington State Over Time

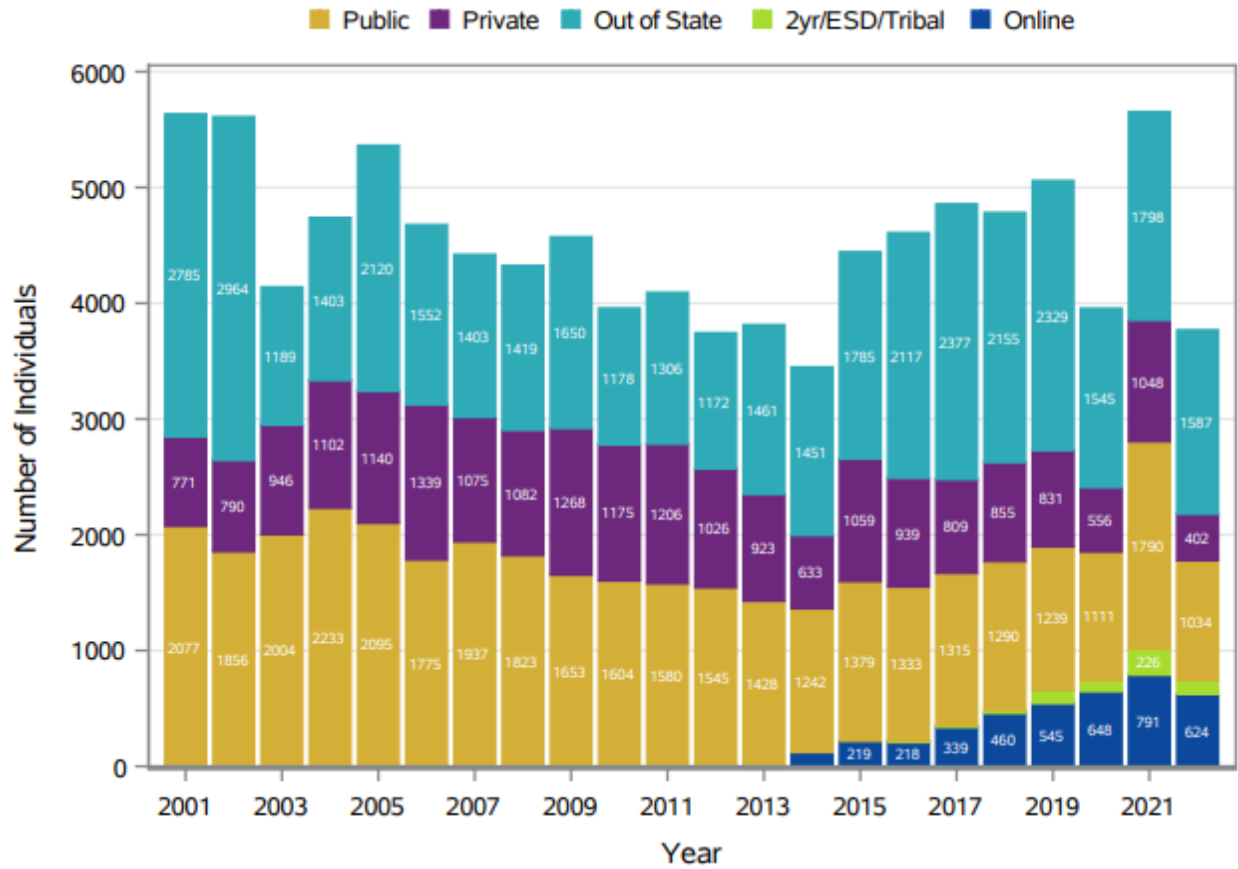


Figure 2. Prior Statuses of Graduates in the Year Before Entering Their Graduation Institution, by Degree

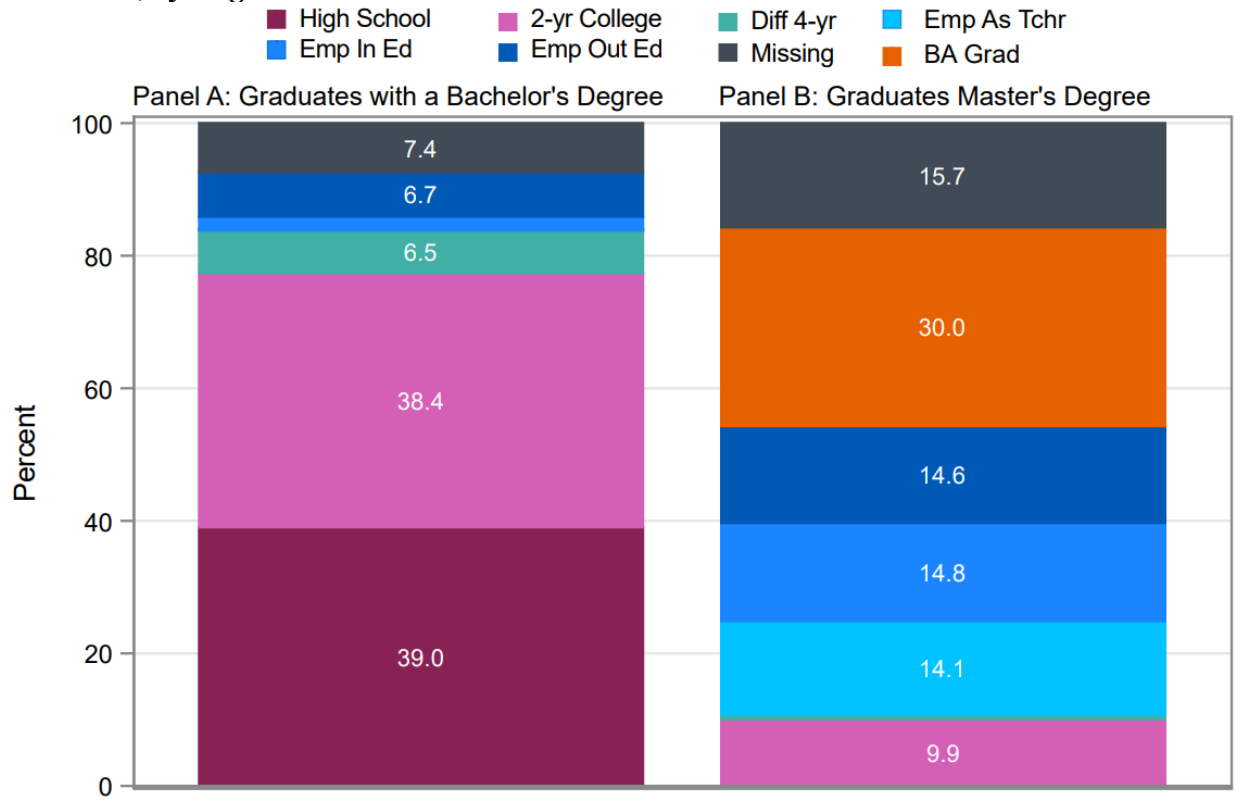


Figure 3. Prior Statuses of Graduates in the Year Before Entering Their Graduation Institution, by Degree and Endorsement

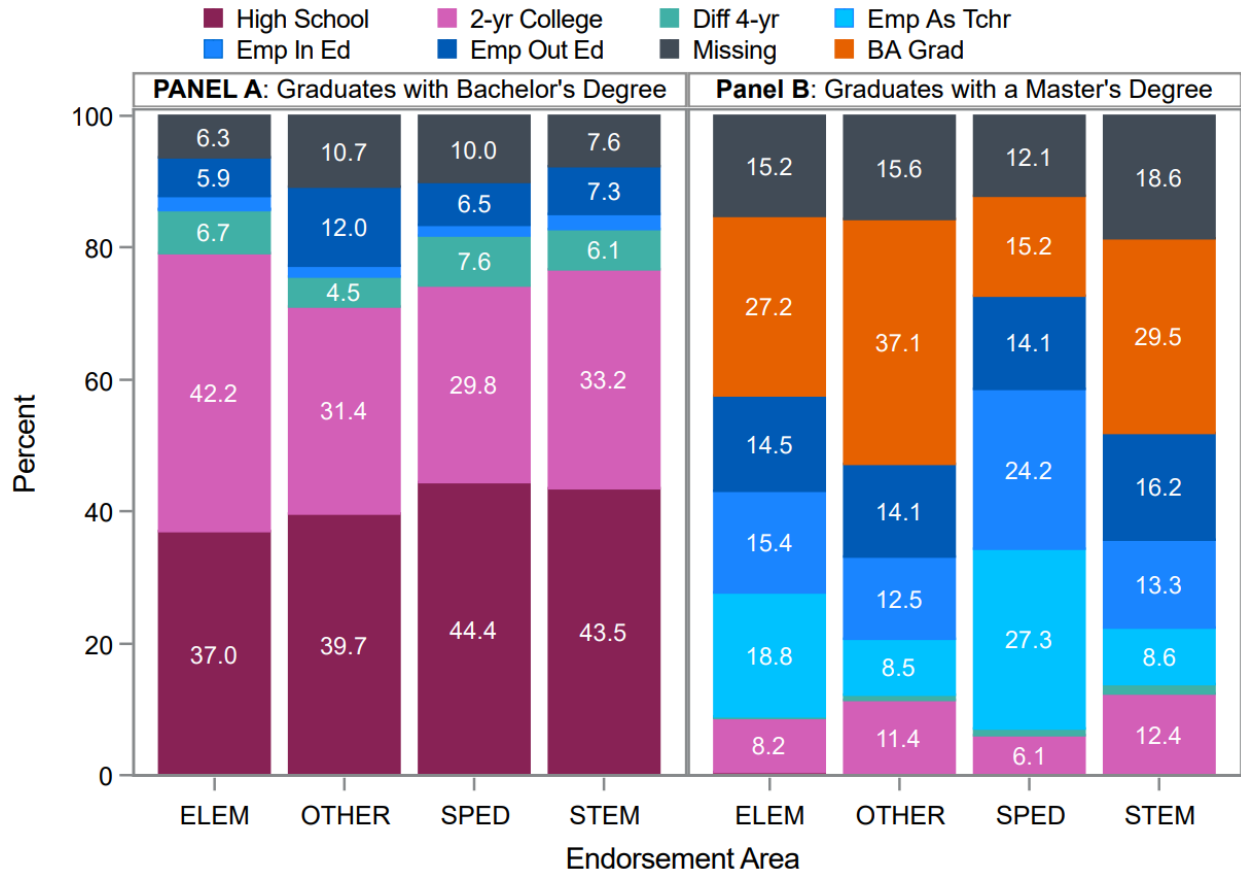


Figure 4. Academic and Employment Histories of Graduates Who Earned a Bachelor's in Education From 2014-2017

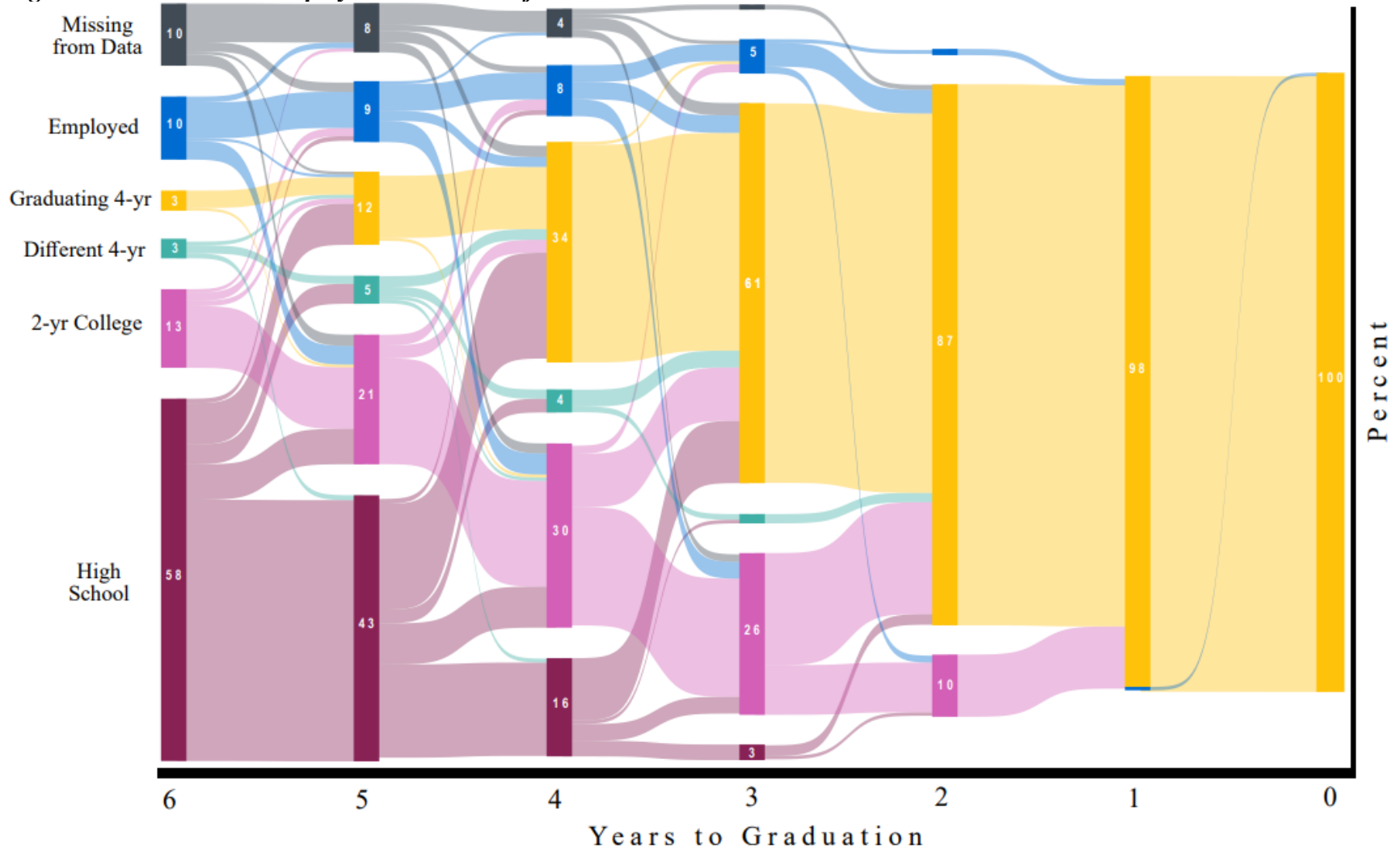


Figure 5. Academic and Employment Histories of Graduates Who Earned a Master's in Education From 2014-2017

