

Additional Certification for Teachers in New York State: Teachers' Experience and Employment Location, Certification Pathways, and Certification Areas

Appendix A. Methods

Appendix B. Supporting analyses

See <https://go.usa.gov/xecdz> for the full report.

Appendix A. Methods

This appendix provides additional information about the study sample, data, and methods, as well as how the study team determined substantive differences.

Sample

The study sample consisted of 199,853 experienced teachers in New York State (those with at least one year of teaching experience in the state) in 2015/16 with at least one certificate. The teacher role as defined by New York State Education Department (NYSED) included prekindergarten–grade 12 classroom teachers, educational technology specialists, library media specialists, and literacy specialists and excluded administrators, pupil personnel service professionals such as school psychologists and school social workers, and supplemental school personnel such as teacher aides and teaching assistants. Staff with more than one role were considered a teacher if they had at least one teaching role.

Additional certificate holders had an average of 7 years of teaching experience in New York State compared with 15 years for teachers in the sample who did not earn additional certificates (table A1).

Table A1. Descriptive statistics of teaching experience, certificates held, and certification areas, by whether experienced teachers in 2015/16 earned additional certificates between October 2015 and October 2017

Statistic	Teachers who earned additional certificates between October 2015 and October 2017			Teachers who did not earn additional certificates between October 2015 and October 2017		
	Years of teaching in New York State	Number of certificates held prior to 2015/16	Number of certification areas certified in prior to 2015/16	Years of teaching in New York State	Number of certificates held prior to 2015/16	Number of certification areas certified in prior to 2015/16
Mean	7	2	2	15	2	2
Median	6	2	2	14	1	1
Mode	1	1	1	15	1	1
Minimum	1	1	1	1	1	1
Maximum	58	12	6	58	12	7

Note: The sample consisted of 199,853 unique experienced teachers in New York State in 2015/16. Outliers were removed from this analysis.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.

To determine which teachers had at least one year of teaching experience in New York State, the study team used a teacher-reported variable for total years of teaching experience in New York State from NYSED’s Basic Education Data System Personnel Master File data. The study team recoded cases where teachers reported zero years of experience in 2015/16 but the teacher appeared in the dataset in a previous year.

Data

The study used certification data from NYSED’s TEACH system and teacher and district data from its Basic Education Data System Personnel Master File for 2015/16–2017/18 (see table A2 for the data elements used in the analyses). The study team engaged in ongoing and extensive communication with NYSED to ensure that information about all variables was complete and accurate.

Table A2. List of variables

Data element	Description	Source
Unique ID	Identification number for each teacher	TEACH system, Basic Education Data System
Total years of teaching experience in New York State	Continuous variable that was recoded to dichotomous: 0 years of experience = new teacher; 1 or more years of experience = not a new teacher	Basic Education Data System
District of employment	Identification number for each district	Basic Education Data System
Region	Categorical variable representing the regions in the state (see appendix B for a list of regions)	Basic Education Data System
Need designation	Categorical variable representing six need designations and charter schools (see appendix B for a list of categories)	Basic Education Data System
Certificate issue date	Date certificate was issued	TEACH System
Certificate title code	Categorical variable as listed in the TEACH System	TEACH System
Certificate type code	Categorical variable indicating type of certificate (for example, Initial or Professional)	TEACH System
Certificate pathway code	Categorical variable indicating which of the following pathways a teacher used to earn a certificate: traditional in-state pathway, alternative in-state pathway, out-of-state pathways, individual evaluation pathway, and/or certificate progression pathway	TEACH System
Additional certificate	Binary variable indicating whether teachers earned at least one additional certificate between October 2015 and October 2017	Authors’ compilation

Source: Authors’ compilation.

The dataset contained 399 past and current certificate titles and extensions. Examples of certificate titles include Music, Biology Grades 5–9, and Students with Disabilities Grades 1–6. A certificate extension is added to a certificate and authorizes the holder to teach an additional student population, grade, or subject not authorized by the baseline certificate. The individual must hold the appropriate baseline certificate. For example, the baseline certificate for the General Science extension is in Biology, Chemistry, Earth Science, or Physics. The study team, in consultation with NYSED, collapsed all the certificate titles and extensions into 19 broad certification areas related to teaching and administration (table A3). Multiple certificate or extension titles were collapsed into one certification area in the cases when there were similar certificate and extension titles in the past and present, when there were similar certificate and extension titles at different grade-level bands for a particular certification area category, and when there were similar certificate and extension titles in the same certification area. In addition, the numerous career and technical education certificate titles in various occupations were collapsed into one certification area.

Table A3. Number and percentage of certificate titles

Certification area	Number of certificate titles in certification area	Percent of total number of certificate titles
Administration ^a	13	2
Arts: dance, music, theater, visual arts	7	1
Bilingual education	8	1
Bilingual special education ^b : bilingual education and at least one of the special education certificates except for gifted education	118	15
Career and technical education	218	28
Childhood education	33	4
Early childhood education	36	5
English language arts	13	2
English to speakers of other languages	3	< 1
Health education	2	< 1
Language other than English	90	12
Literacy	3	< 1
Library media specialist	5	1
Mathematics	9	1
Science: biology, chemistry, earth science, general science, physics	72	9
Social studies	9	1
Special education ^c : students with disabilities, students with disabilities and content area, blind and visually impaired, deaf and hard of hearing, gifted education, severe or multiple disabilities, ^d speech and language disabilities	111	14
Physical education	3	< 1
Other certification areas ^e : agriculture, business and marketing, educational technology specialist, family and consumer sciences, generalist in middle education, and technology education	17	2
Total	770	100

Note: Of the 770 possible certificate titles, only 399 past and current certificates were earned as baseline or additional certificates by teachers in the study sample.

a. Administration is a nonteaching certification area.

b. Teachers were counted in the bilingual special education certification area if they earned additional certificates in both the bilingual education and special education certification areas, if they held a baseline certificate in bilingual education and earned an additional certificate in special education, or if they held a baseline certificate in special education (excluding gifted education) and earned an additional certificate in bilingual education.

c. Special education includes certificates in multiple special education subject areas, some of which the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. The special education shortage area is based on courses taught by teachers who hold Special Education or Students with Disabilities certificate titles, rather than specialized certificates in the area of special education, such as Blind and Visually Impaired and Deaf and Hard of Hearing.

d. Severe or multiple disabilities is an annotation on a certificate, not a certificate in and of itself.

e. "Other certification areas" includes certificates related to subject areas that the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. However, teachers could be certified in those areas and fill subject area shortages by teaching in those areas. For example, a Technology Education certificate holder can teach certain career and technical education courses that cross multiple subject areas. Fewer than 2 percent of teachers had earned certificates in each certification area within the other certification areas category.

Source: Authors' compilation in consultation with New York State Education Department staff.

The analysis included all regions in New York State: Capital District, Central, Finger Lakes, Hudson Valley, Long Island, Mohawk Valley, New York City, North Country, Southern Tier, and Western. There are six need designations. The high-need designations are New York City district schools, large city—not New York City, urban/suburban, and rural. The two other designations are average need and low need (New York State Education Department, n.d.a). Some teachers in New York State work in or for Boards of Cooperative Educational Services (BOCES), which provide education programs and services to New York State districts. An additional need designation was created to distinguish teachers who work in or for the BOCES from teachers with missing need designation data. Need designation data were reported at the district level with the exception of teachers employed in charter schools. Charter schools are not included in the need designations in New York State, but for completeness they are included as a separate category. In the full sample 3,773 teachers (2 percent) were missing region and need designation data, and among additional certificate holders 167 (2 percent) were missing region and need designation data.

The number of teachers included in the analyses for figures and tables in the study varies because some teachers earn multiple certificates in multiple certification areas through multiple pathways and because of missing data (table A4).

Table A4. Sample of experienced teachers across the study

Sample	Number of unique teachers	Number of unique additional certificate holders	Sample size in figures and tables for all experienced teachers after teachers who earned multiple certificates in multiple certification areas through multiple pathways were accounted for	Sample size in figures and tables for additional certificate holders after teachers who earned multiple certificates in multiple certification areas through multiple pathways were accounted for
Overall sample	199,853	9,865	308,111 because some experienced teachers earned multiple baseline certificates in a given area (table 2)	17,480 because some additional certificate holders earned multiple additional certificates in a given area and some earned at least one additional certificate in an area unrelated to classroom teaching or administration (table 2)
Research question 1 sample for need designation ^a	199,853	9,865	194,519 because some experienced teachers were missing need designation data and some were employed in districts with more than one need designation (table 3)	9,658 because some additional certificate holders were employed in or for Boards of Cooperative Educational Services in New York State (which do not have a need designation), some were missing need designation data, and some were employed in districts with two different need designations (table 3)
Research question 2 sample for certification pathway	na	9,865	na	10,448 because some additional certificate holders earned multiple additional certificates through multiple pathways (table 4)
Research question 3 sample for additional certificate holders	na	9,865	na	10,740 because some additional certificate holders earned certificates in multiple certification areas (figure 1)
Research question 3 sample for additional certificate holders by shortage area	na	9,865; 4,685 in shortage certification areas	na	4,685 (figure 2)
Research question 3a sample for certification pathway by certification areas	na	9,865	na	29,159 because some additional certificate holders earned certificates through multiple pathways and in multiple certification areas (table 5)

na is not applicable.

a. Additional information about the sample used in the analysis by need designation is provided in table B3 in appendix B.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.

Methods

The study team calculated the number and percentage of experienced teachers with at least one year of teaching experience in New York State in 2015/16 who earned and did not earn at least one additional certificate between

October 2015 and October 2017. Excluding Internship certificates, there were 10 certificate types for teachers at the start of the study (table A5), and some certificate types expire. Certificates were included in the analysis if their expiration date was later than October 7, 2015. Teachers could earn multiple certificates corresponding to the same certificate title as they progressed from an Initial certificate to a Professional certificate. For example, candidates could receive a Conditional Initial certificate valid for one year until they passed the New York State teacher performance assessment (edTPA). Once they passed the assessment, they would be issued an Initial certificate valid for five years. They could then choose to take the steps to earn a Professional certificate for that same certificate title. Additional certificates in the study excluded certificates earned when progressing in this way from an Initial certificate to a Professional certificate in New York State (see table A5). Instead, an additional certificate was counted if the title of the additional certificate differed from the title of the baseline certificate.

To distinguish true additional certificates, as defined in this study, from multiple certificate types of the same certificate title, the certificate types were collapsed and not considered as a variable of interest in any analyses. To collapse the certificate types with the same certificate title, the issue date of the first certificate issued in that title and the expiration date of the final certificate issued in that title were kept to determine whether the certificate was active. For example, if a teacher earned multiple certificates with the same certificate title through the certificate progression pathway, the certificate was counted once only.

Table A5. Certificate types

Certificate type	Description	Duration of certificate validity	Leads to
Initial certificate	Issued as an entry-level certificate for classroom teachers in specific subject or grade titles.	Five years	Professional certificate
Initial reissuance—classroom teacher	A reissuance of an Initial certificate that has expired.	Five years	Professional certificate
Conditional Initial certificate—classroom teacher	Issued to an individual holding a valid teaching certificate in the same or equivalent title from another U.S. state or territory. To earn a Conditional Initial certificate, applicants must meet all requirements for the Initial certificate through the “Completion of a Comparable Educator Program in Another U.S. State” pathway except for the edTPA. ^a	One year, during which the individual would complete and pass the edTPA assessment	Initial certificate
Professional certificate	Issued as the advanced-level certificate for classroom teachers in specific subject or grade titles as well as educational leaders.	Continuously valid. Certificate holders must register with the New York State Education Department and complete continuing teacher and leader education (CTLE).	na
Supplementary certificate	Issued to New York State–certified classroom teachers to enable them to teach in a different subject area where a shortage exists. The district/employer must submit a recommendation in the TEACH system.	Five years, while the individual completes the requirements for the Initial or Professional certificate in the new subject area. Supplementary certificates issued prior to May 2017 were valid for three years.	Initial or Professional certificate

Transitional A certificate	Issued to permit employment in a specific career and technical education title in a New York State school district or Board of Cooperative Educational Services ^b for an individual who does not meet the requirements for an Initial certificate but possesses the requisite education, credentials, and/or work experience.	Up to three years, while the individual is employed in a New York State school district or Board of Cooperative Educational Services	Initial or Professional certificate
Transitional B certificate	Issued to permit employment as a classroom teacher in a New York State public school for an individual who is enrolled in a New York State-registered Transitional B program (a program for candidates holding an undergraduate degree in the subject area of the certificate sought). The Transitional B certificate is tied to the school district placement.	Up to three years, while the individual is matriculated in the Transitional B program. When a candidate completes or leaves the program, the certificate is no longer valid.	Initial certificate (Transitional B)
Transitional C certificate	Issued to permit employment as a classroom teacher in a New York State public school for an individual who is enrolled in a New York State-registered Transitional C program (a program for candidates holding a graduate degree in the subject area of the certificate sought). The Transitional C certificate is tied to the school district placement.	Up to three years, while the individual is matriculated in the Transitional C program. When a candidate completes or leaves the program, the certificate is no longer valid.	Professional certificate (Transitional C)
Transitional G certificate	Issued to permit employment as a classroom teacher in a New York State public school or Board of Cooperative Educational Services for a college professor who holds a graduate degree in any area for which there is a certificate title and has successfully taught the subject of the desired certificate area at the college level for at least 2 of the 10 years immediately preceding the application. The district or employer must submit a recommendation in the TEACH system.	Two years	Initial certificate
Residency certificate	Issued to permit the employment of an individual who is enrolled in the New York State Classroom Academy Residency pilot program.	Up to three years, while the individual is matriculated in the program. When a candidate completes or leaves the program, the certificate is no longer valid.	Initial certificate
Internship certificate	Issued to permit the employment of an individual who is enrolled in a New York State-registered graduate teacher, school leader, or school counselor program that includes an internship and has completed at least half of the semester hour requirements in the program.	Up to two years, while the individual is matriculated in the program.	Initial certificate

na is not applicable because a Professional certificate does not lead to another type of certificate for the same certificate title in which the Professional certificate is issued.

a. The edTPA is the New York State teacher performance assessment and satisfies the New York State teacher performance assessment requirement for certification.

b. The Boards of Cooperative Educational Services of New York State provide education programs and services to New York State districts.

Source: New York State Education Department, n.d.

The study team included additional certificates with issue dates on or after October 7, 2015.¹ Certificates that were expired, revoked, surrendered, or suspended were not included as additional certificates in the analyses. A teacher’s certification pathway was calculated as a binary variable, yes or no, for each type of pathway regardless of how many certificates a teacher earned through that pathway.

The study team calculated the number and percentage of teachers who earned certificates in each certification area. Certificates issued prior to October 7, 2015, were coded as baseline certificates. Certificates issued between October 7, 2015, and October 4, 2017, were coded as additional certificates. The study team also calculated the number and percentage of teachers who were employed in each region in the state and in each need designation.

Determining substantive differences

To determine whether differences were substantive for each research question, the study team used a threshold of 5 years or 5 percentage points. This is the same threshold used in recent studies by the Regional Educational Laboratory Midwest and the Regional Education Laboratory Southwest (Burkhauser, Mellor, Garland, & Osman, 2021; Feygin, Guarino, & Pardo, 2019).

References

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¹ This study uses a snapshot of teacher data from the first Wednesday in October each year (New York State Education Department, 2019).

Appendix B. Supporting analyses

This appendix contains supporting descriptive findings of the report.

Tables B1–B3 supplement tables 1–5 and figures 1–3 in the main report.

Table B1. Numbers and percentages of additional certificate holders, by region, October 2015–October 2017

Region	Number of experienced teachers	Number of additional certificate holders	Additional certificate holders as a percentage of experienced teachers
New York City	65,443	5,253	8
Long Island	35,027	1,320	4
Hudson Valley	25,961	837	3
Western	15,526	464	3
Finger Lakes	14,866	542	4
Capital District	11,655	365	3
Central	9,089	346	4
Southern Tier	7,512	235	3
Mohawk Valley	5,738	197	3
North Country	5,174	148	3

Note: The sample consisted of 199,853 unique experienced teachers in New York State in 2015/16, 9,865 of whom earned at least one additional certificate between October 2015 and October 2017. 3,939 experienced teachers were missing region data, and 167 additional certificate holders were missing region data. Of all experienced teachers, 77 were employed in two regions in New York State, and 9 additional certificate holders were employed in two regions in New York State in 2015/16. Some 68 teachers who did not earn an additional certificate were employed in two regions in New York State in 2015/16.

Source: Authors' analyses based on the New York State Education Department Basic Education Data System Personnel Master File data (2015–18) and the New York State Education Department TEACH data (2015–18).

Table B2. Numbers and percentages of additional certificate holders, by additional certification area, October 2015–October 2017

Additional certification area	Number of additional certificate holders	Percent of total number of additional certificate holders
Administration ^a	3,560	36
Special education ^b : students with disabilities, students with disabilities and content area, blind and visually impaired, deaf and hard of hearing, gifted education, severe or multiple disabilities, ^c speech and language disabilities	2,710	27
English to speakers of other languages	994	10
Literacy	537	5
Early childhood education	473	5
Childhood education	393	4
Bilingual education	277	3
Science: biology, chemistry, earth science, general science, physics	265	3
Career and technical education	237	2
Bilingual special education ^d : bilingual education and at least one of the special education certificates except for gifted education	195	2
English language arts	199	2
Language other than English	190	2
Arts: dance, music, theater, visual arts	119	1
Mathematics	112	1
Social studies	104	1
Library media specialist	71	1
Health education	69	1
Physical education	47	< 1
Other certification areas ^e : agriculture, business and marketing, educational technology specialist, family and consumer sciences, generalist in middle education, and technology education	188	2
Sum	10,740	108

Note: The sample consisted of 9,865 unique experienced teachers in New York State who earned at least one additional certificate between October 2015 and October 2017. The values in the second column sum to 10,740 and the values in the third column sum to more than 100 percent because some teachers earned multiple additional certificates in multiple certification areas (8,536 earned additional certificates in one certification area, 897 earned additional certificates in two certification areas, 118 earned additional certificates in three certification areas, and 14 earned additional certificates in four certification areas), and 300 teachers earned additional certificates in areas unrelated to classroom teaching or administration, such as pupil personnel services.

a. Administration is a nonteaching certification area.

b. Special education includes certificates in multiple special education subject areas, some of which the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. The special education shortage area is based on courses taught by teachers who hold Special Education or Students with Disabilities certificate titles, rather than specialized certificates in the area of special education, such as Blind and Visually Impaired and Deaf and Hard of Hearing.

c. Severe or multiple disabilities is an annotation on a certificate, not a certificate in and of itself.

d. Teachers were counted in the bilingual special education certification area if they earned additional certificates in both the bilingual education and special education certification areas, if they held a baseline certificate in bilingual education and earned an additional certificate in special education, or if they held a baseline certificate in special education (excluding gifted education) and earned an additional certificate in bilingual education.

e. “Other certification areas” includes certificates related to subject areas that the New York State Education Department does not report to the U.S. Department of Education in this specificity when computing data on shortages. However, teachers could be certified in those areas and fill subject area shortages by teaching in those areas. For example, a Technology Education certificate holder can teach certain career and technical education courses that cross multiple subject areas. Fewer than 2 percent of teachers had earned certificates in each certification area within the other certification areas category.

Source: Authors’ analyses of 2015–18 data from the New York State Education Department’s TEACH system and Basic Education Data System Personnel Master File.

Table B3. Percentages of additional certificate holders who earned additional certificates in each certification area, by baseline certification area, October 2015–October 2017

Baseline certification area	Adm	Arts	BED	BSPED	CTE	CED	ECE	ELA	ESOL	HE	LOTE	LMS	Lit	Math	Sci	Soc stud	SPED	PE	Other
Administration (Adm; <i>n</i> = 480)	67	b	b	0	4	b	b	b	6	b	2	b	b	b	2	b	9	b	b
Arts (<i>n</i> = 214)	49	12	b	0	7	b	3	b	8	b	b	0	3	b	b	b	12	b	4
Bilingual education (BED; <i>n</i> = 275)	34	b	2	0	0	b	8	1	32	0	3	b	2	b	b	b	21	0	0
Bilingual special education ^a (BSPED; <i>n</i> = 105)	38	0	b	0	0	b	b	b	28	0	0	b	b	0	0	0	32	0	0
Career and technical education (CTE; <i>n</i> = 178)	33	3	b	0	44	b	b	b	7	b	b	b	b	b	b	b	5	b	4
Childhood education (CED; <i>n</i> = 4,624)	31	1	3	<1	1	b	9	1	12	0	1	1	8	1	1	<1	39	<1	1
Early childhood education (ECE; <i>n</i> = 1,729)	15	<1	2	1	<1	5	<1	<1	10	0	1	<1	7	<1	<1	<1	70	<1	1
English language arts (ELA; <i>n</i> = 816)	49	3	1	b	1	2	1	6	14	b	b	3	9	b	b	b	13	b	1
English to speakers of other languages (ESOL; <i>n</i> = 555)	35	1	8	1	b	16	7	11	b	0	6	b	6	b	b	2	17	b	1
Health education (HE; <i>n</i> = 136)	59	0	0	0	6	b	b	0	5	0	0	0	b	0	b	0	7	4	12
Language other than English (LOTE; <i>n</i> = 505)	21	b	3	0	b	3	1	3	30	0	31	b	3	b	1	b	6	0	2
Library media specialist (LMS; <i>n</i> = 33)	67	b	0	0	0	0	0	b	b	0	0	0	b	0	0	0	b	0	b
Literacy (Lit; <i>n</i> = 908)	36	b	1	0	b	2	9	1	12	0	1	b	3	b	b	b	37	b	1
Mathematics (Math; <i>n</i> = 568)	49	1	4	0	3	1	1	b	7	b	b	0	2	10	2	b	18	0	4

Baseline certification area	Adm	Arts	BED	BSPED	CTE	CED	ECE	ELA	ESOL	HE	LOTE	LMS	Lit	Math	Sci	Soc stud	SPED	PE	Other
Science (Sci; <i>n</i> = 611)	42	^b	4	0	3	^b	^b	1	4	0	^b	0	1	1	35	^b	9	^b	2
Social studies (Soc stud; <i>n</i> = 707)	59	1	3	0	2	2	^b	1	8	^b	^b	1	4	^b	^b	4	14	1	2
Special education (SPED; <i>n</i> = 4,232)	31	1	3	< 1	1	4	6	1	9	^b	< 1	< 1	5	1	1	1	44	< 1	1
Physical education (PE; <i>n</i> = 269)	59	0	0	0	^b	^b	^b	0	^b	23	0	0	0	^b	^b	0	6	0	5
Other certificate areas (Other; <i>n</i> = 535)	44	2	2	^b	15	2	2	2	4	1	1	1	3	1	2	2	19	1	5

Note: The sample consisted of 9,865 unique experienced teachers in New York State who earned at least one additional certificate between October 2015 and October 2017. Some teachers earned multiple additional certificates in the same certification area or in multiple certification areas. The total percentages for the baseline certification areas of health education and administration sum to less than 100 percent because some teachers earned certificates in areas that were not related to classroom teaching or administration, such as pupil personnel services. A total of 8,536 teachers earned additional certificates in one certification area, 897 earned additional certificates in two certification areas, 118 earned additional certificates in three certification areas, and 14 earned additional certificates in four certification areas. A total of 300 teachers earned additional certificates in areas unrelated to classroom teaching or administration, such as pupil personnel services.

a. Teachers were counted in the bilingual special education certification area if they earned additional certificates in both the bilingual education and special education certification areas, if they held a baseline certificate in bilingual education and earned an additional certificate in special education, or if they held a baseline certificate in special education (excluding gifted education) and earned an additional certificate in bilingual education.

b. Data have been suppressed to protect privacy because of the small number or percentage of subjects in the cell.

Source: Authors' analyses of 2015–18 data from the New York State Education Department's TEACH system and Basic Education Data System Personnel Master File.