Technical Appendix:

The National Council on Teacher Quality's Ratings of Teacher Preparation Programs and Measures of Teacher Performance

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Purpose

The National Council on Teacher Quality (NCTQ) regularly prepares reports rating teacher preparation programs across the United States on a set of input and process-based standards.[1] The purpose of this research project was to estimate the associations between NCTQ overall program scores, standard scores, and indicators for selected standards and teachers' performance in their classrooms, as measured by value-added scores and evaluation ratings, for teacher preparation program graduates who were in their first or second-year of teaching in North Carolina public schools (NCPS) in 2011-12 or 2012-13. This technical appendix describes the data sources, sample, missing data issues and solutions, measures, and analytical models used to estimate these associations.

Data by Source

NCTQ: To facilitate this study NCTQ provided us two sets of data. First, NCTQ supplied us with the overall program score, standard scores, and, for select standards, the underlying indicator values for teacher preparation programs in North Carolina and the set of out-of-state preparation programs that had initially prepared beginning teachers working in NCPS.[2] These data were for each of four types of teacher preparation programs (where applicable)[3]: elementary undergraduate, elementary graduate degree, secondary undergraduate, or secondary graduate degree. At the elementary level (undergraduate or graduate degree) the NCTQ data included an overall program score and standard scores for Selection Criteria, Early Reading, English Language Learners, Struggling Readers, Elementary Mathematics, Elementary Content, Classroom Management, Lesson Planning, Assessment and Data, Student Teaching, and Outcomes. At the secondary level (undergraduate or graduate degree) the NCTQ data included an overall program score and standard scores for Selection Criteria, Middle School Content, High School Content, Classroom Management, Lesson Planning, Assessment and Data, Student Teaching, Secondary Methods, and Outcomes. Across elementary/secondary and undergraduate/graduate programs, NCTQ also provided indicator-level data for the following five standards: Selection Criteria, Elementary Mathematics, Classroom Management, Student

[1] To view the most recent report, please see http://www.nctq.org/dmsStage/Teacher_Prep_Review_2014_Report .

[2] We used teacher education and licensure data, supplied by the North Carolina Department of Public Instruction, to identify 359 out-of-state colleges/universities that had initially-prepared at least one first-year teacher in NCPS in the 2009-10, 2010-11, or 2011-12 academic years. We supplied NCTQ with identifiers for these out-of-state colleges/universities and they provided us with the available overall program, standard, and indicator scores.

[3] When teacher preparation programs did not offer one or more of the four types of programs, NCTQ provided data for all the programs that the institution offered.

Teaching, and Outcomes.[4] These indicators (e.g. for the Outcomes standard, whether a preparation program surveys its graduates) are the underlying measures collected by NCTQ and are used to generate standard scores.

Second, NCTQ supplied data to determine the graduating cohorts from each preparation program for whom the NCTQ scores and underlying indicators applied. To do so, NCTQ reviewed and dated the evidences they had collected to rate teacher preparation programs on the Selection Criteria and Early Reading standards and identified the first graduating cohort at each preparation program who had experienced the rated practices. For each preparation program we included this first cohort and all available subsequent graduating cohorts in our study sample. Graduates from a select number of preparation programs were excluded because (1) NCTQ could not date the Selection Criteria and Early Reading evidences or (2) the earliest eligible graduating cohort was concurrent with or after our most recent year (2012-13) of teacher value-added and evaluation rating data.

University of North Carolina General Administration (UNCGA): To identify individuals initially prepared to teach by the public institutions of higher education in North Carolina, the UNCGA supplied us with data files for graduates at the undergraduate and graduate degree levels. These files detailed graduates' graduation year, university, academic major, and licensure area(s) in which they were prepared to teach.

North Carolina Department of Public Instruction (NCDPI): To identify individuals initially prepared to teach by private and independent colleges and universities in North Carolina, the teacher licensure office at the NCDPI provided us with a data file for graduates at the undergraduate and graduate degree levels. This file detailed graduates' graduation year, university, degree level (undergraduate, graduate, or licensure only), and licensure area(s) in which they were prepared to teach.

To identify individuals prepared to teach by out-of-state colleges and universities, the NCDPI provided us with (1) an education file, detailing the level of degree earned, the degree-granting institution, and the graduation date and (2) licensure files, indicating teachers' licensure areas, basis for the teaching license (e.g. a reciprocal license based on preparation at an out-of-state university), and degree level of the teaching license.

Finally, to facilitate our value-added and evaluation rating analyses, the NCDPI supplied us with student test score and demographic data, classroom rosters, school-level characteristics, salary and licensure files for school personnel, and teacher evaluation ratings.

[4] We selected these five NCTQ standards for further, indicator-level analyses based on conversations with NCTQ representatives. For further information on all of the indicators for NCTQ's standards, please see http://www.nctq.org/dmsView/Standards_and_Indicators_Full.

Study Sample

Full Teacher Sample: To link NCPS teachers to their preparation programs, and by extension, to NCTQ preparation program ratings, we used a two-stage coding process. The goal of stage one was to place graduates of North Carolina public and private universities and out-of-state universities, if applicable, into one of the following four NCTQ categories—elementary undergraduate, elementary graduate degree, secondary undergraduate, and secondary graduate degree. For North Carolina public and private universities, we used data supplied by the UNCGA and the NCDPI, respectively, to (1) identify graduates with an undergraduate or graduate level education degree; (2) keep records for graduates whose degree resulted in a teaching license in a core content area[5]; and (3) keep records, by preparation program, for graduates whose graduation date aligned with the eligible cohorts identified by NCTQ. For out-of-state universities we used education and licensure data provided by the NCDPI to (1) identify graduates with an undergraduate or graduate degree from an out-of-state institution; (2) keep records for graduates whose teaching license is in a core content area; (3) keep records for teaching licenses based on a reciprocal agreement with an accreditation agency (e.g. NCATE) or out-of-state university; (4) keep records if the degree level (undergraduate or Masters level) of the teaching license matches the graduates' degree level; and (5) keep records, by preparation program, for graduates whose graduation date aligns with the eligible cohorts identified by NCTQ.[6] As a result of this coding, we created 12 stage one files: elementary undergraduate, elementary graduate degree, secondary undergraduate, and secondary graduate degree files for North Carolina public, North Carolina private, and out-of-state university graduates.

The goal of stage two was to verify whether the degrees identified in stage one initially prepared graduates to teach—rather than additional degrees after entry into teaching. To do so, we created a file with teachers' experience values in 2011-12 and 2012-13 and kept teachers from our stage one files who were first and/or second year teachers in these academic years. We chose these years for our full teacher sample since they best align with the eligible cohort data supplied by NCTQ.[7] To finalize the full teacher sample—and ensure that we correctly identified a teacher's

[5] To assign graduates to the elementary undergraduate or elementary graduate degree categories we used a teaching license in elementary grades (K-6). To assign graduates to the secondary undergraduate or secondary graduate degree categories we used the following teaching licenses: middle grades language arts, mathematics, science, and social studies and secondary grades English, mathematics, science (general), earth science, biology, physics, chemistry, social studies, political science, geography, history, and economics. We excluded graduates whose teacher preparation resulted in licenses in other areas, such as birth to pre-kindergarten, exceptional children, foreign languages, health and physical education, English as a second language, and arts.

[6] Unlike the graduation data for North Carolina public and private universities, the graduation data for out-of-state universities does not identify graduates' academic major (e.g. education). Therefore, to ensure that graduates' teaching licenses were based on degrees from a specific out-of-state preparation program, we used the *basis code* and *degree level* variables in the teacher licensure data to confirm that graduates' teaching licenses were based on degrees from out-of-state universities and that the degree level (undergraduate or masters) of the teaching license matches the level of degree earned out-of-state.

[7] NCTQ supplied us with data for 781 preparation programs. For 30 percent of these programs the earliest eligible graduating cohort we could include in analyses was 2010-11 (first-year teachers in 2011-12); for nearly 50 percent of these preparation programs the earliest eligible graduating cohort we could include in analyses was 2011-12 (first-year teachers in 2012-13).

preparation program—we dropped cases where a teacher's graduation date came after beginning teaching (approximately two percent of the sample) and where a teacher was in more than one NCTQ program category (approximately one percent of the sample).[8] Finally, we merged the NCTQ overall program scores, standard scores, and indicators into the full teacher sample file.

As shown in Table A, the full teacher sample includes 4,513 first and/or second year teachers in NCPS in 2011-12 and 2012-13 who we have linked to their teacher preparation program and NCTQ scores. Overall, two-thirds of these records are at the elementary level (undergraduate or graduate degree); the remaining one-third are at the secondary level. More than 75 percent of the records come from teachers prepared at public and private universities in North Carolina (a large majority are linked to in-state public preparation programs); nearly 25 percent of the records come from teachers prepared at out-of-state institutions.

Value-Added Sample: The sample for value-added analyses includes all first and second year teachers in the 2011-12 and 2012-13 academic years that we linked to NCTQ teacher preparation program ratings and were teaching a tested-grade/subject-area. We ran value-added models for End-of-Grade mathematics and reading exams in elementary grades (4-5), value-added models for End-of-Grade mathematics and reading exams in middle grades (6-8), and separate value-added models for secondary grades End-of-Course exams—algebra I,[9] biology, and English I/II.[10] We ran models with first-year teachers only and with first and second-year teachers combined (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009).

Evaluation Rating Sample: The sample for evaluation rating analyses includes all first and second-year teachers in the 2011-12 and 2012-13 academic years that we linked to NCTQ teacher preparation program ratings and were evaluated by a school administrator. We ran evaluation rating models for each of the five North Carolina Professional Teaching Standards (NCPTS); for each standard we estimated separate models for first-year teachers only and for first and second-year teachers combined.

[8] These graduates earned teaching licenses in both an elementary and secondary core content licensure area at the same time and, therefore, could have been included in both the elementary undergraduate (graduate degree) and secondary undergraduate (graduate degree) categories.

[9] Students can take the North Carolina EOC algebra I exam in middle or high school grades. Approximately one-third of students take algebra I in middle grades (typically grade 8) and the remaining students take algebra I in high school grades (typically grade 9).

[10] In 2011-12 North Carolina assessed high school students with an EOC exam in English I (typically taken by students in 9th grade). In 2012-13 North Carolina assessed high school students with an EOC exam in English II (typically taken by students in 10th grade).

Missing Data[11]

Regarding the extent of missing data for the NCTQ overall program and standard scores, Table B displays counts of teacher preparation programs, both overall and at the elementary and secondary levels (undergraduate and graduate degree), separately, with a score for a particular NCTQ measure. Table C presents counts of teachers in the full sample, and at the elementary and secondary levels (undergraduate and graduate degree), separately, with a score for a particular NCTQ measure. While some NCTQ measures are populated for a large percentage of the teaching sample (e.g. overall program score, Selection Criteria, and Student Teaching), other standards have significantly more missing data (e.g. Classroom Management, Lesson Planning, and Assessment and Data). These missing data impact the sample of teachers included in value-added and evaluation rating analyses and may impact those results. Therefore, in addition to the default option of case-wise deletion—deleting an observation if any of the data used in the analysis is missing for that observation—we took two other approaches to address missing data. First, we imputed the missing overall program scores, standard scores, and indicators for all of the preparation programs (781 in total) in the data supplied by NCTQ. To impute we used all available overall program scores, standard scores, and indicator data and created 50 imputed datasets with the SAS proc mi procedure; post-imputation, we used the Stata mi estimate command to run value-added or evaluation rating models on each of these 50 imputed datasets and generate a single set of coefficient and standard error estimates. Second, we created dichotomous variables equal to '1' if the NCTQ data were missing and replaced the missing value with a '0'. In value-added and evaluation rating analyses using this second missing data approach, we included both the NCTQ score and the variable indicating missingness. Based on comprehensive reviews of the missing data and attrition research literature, we believe that it is unwise to assume that the missing data is ignorable and we present results based on multiple imputation in the main report (Graham, 2009; Shafer & Graham, 2002). In this technical appendix we also include tables that present coefficient estimates from each of the three methods: case-wise deletion, multiple imputation, and indicator coding for missing values. Across approaches we view the differences in coefficients as minor; interested readers can inspect the differences for themselves (See Tables F-T).

Outcomes, Focal Measures, and Covariates

Outcome Measures: The outcome variable for the teacher value-added analyses is students' current test score performance on the North Carolina End-of-Grade (grades 3-8) mathematics and reading exams—standardized within subject, grade, and year—or the End-of-Course algebra I, biology, and English I/II exams—standardized within subject and year. Standardized mathematics and reading scores from the previous grade, or from 8th grade for high school students, serve as the measure of prior student achievement.

The dependent variable for the teacher evaluation rating analyses comes from the North Carolina Educator Evaluation System (NCEES), an evaluation rubric in place across NCPS in which school administrators rate teachers on five NCPTS: (Standard 1) teachers demonstrate leadership; (Standard 2) teachers establish a respectful classroom environment for a diverse

[11] Please see http://www.nctq.org/dmsView/TPR_2014_GM_Appendix for further details on NCTQ's data collection methods and timeline and participation by teacher preparation programs.

group of students; (Standard 3) teachers know the content they teach; (Standard 4) teachers facilitate learning for their students; and (Standard 5) teachers reflect on their practice. To evaluate teachers, school administrators use paper-based evidences and classroom observations to document key teaching practices and rate teachers as either not demonstrated, developing, proficient, advanced, or distinguished on each of the five NCPTS. For evaluation rating analyses the outcome measure is a 1-5 ordinal value where not demonstrated is equal to 1 and distinguished is equal to 5.

Focal NCTQ Measures: For both our value-added and evaluation rating analyses, we report results from two main models. First, our NCTQ *Program Score* models assess whether graduates of more highly-rated preparation programs are more effective or receive higher evaluation ratings than their peers from programs with lower ratings. Specifically, NCTQ rated programs on a 0-125 point scale and then, based on this rating, classified programs as either Level I (50 points or fewer), Level II (51-66 points), Level III (67-82 points), or Level IV (83 points or higher). In our analyses, we make graduates from Level I programs the reference category and include dichotomous variables for graduates from Level II, Level III, and Level IV programs.[12] If the NCTQ overall program scores are associated with the effectiveness of programs' graduates, as measured by value-added or evaluation ratings, the coefficients on Level II, III, and IV should be monotonically increasing and statistically significant.

Second, our NCTQ *Standards* models examine whether programs' scores on NCTQ's standards predict the value-added or evaluation ratings of their graduates. For these *Standards* analyses we specify separate models for each NCTQ standard so that we can best identify the full impact of each standard on the outcome of interest. In other words, the association of the standard score with the teacher performance measure controls for the model covariates listed below but does not control for the other NCTQ standard scores. This reduces the possibility that correlations between the standard scores affect the coefficient estimates or inflate the standard errors. For graduates of elementary grades teacher preparation programs (undergraduate or graduate degree) we analyze the Selection Criteria, Early Reading, English Language Learners, Struggling Readers, Elementary Mathematics, Elementary Content, Classroom Management, Planning, Assessment and Data, Student Teaching, and Outcomes standards; for graduates of secondary grades preparation programs (middle and high school), we analyze the Selection Criteria, Middle School Content, High School Content, Classroom Management, Planning, Assessment and Data, Student Teaching, Secondary Methods, and Outcomes standards. All of these NCTQ standards are scored on a 0-4 scale; in models using imputed data, we retain the imputed standard values (not rounded to 0-4) in analyses (Graham, 2009).

Finally, we estimate a set of supplementary *Indicators* models assessing the associations between indicator-level data from NCTQ and both teacher value-added measures and evaluation ratings. We received indicator-level data for five NCTQ standards (Selection Criteria, Elementary Mathematics, Classroom Management, Student Teaching, and Outcomes). For the Elementary Mathematics, Classroom Management, Student Teaching, and Outcomes standards we include

[12] In addition to models with indicators for each of the four program score levels, we also specified value-added and evaluation rating models with a continuous program score variable. Results from these models are available upon request.

all available indicator measures in the value-added and evaluation rating models. This allows us to see if one or more of the indicators are influencing the effects in the *Standards* models described above. For the Selection Criteria standard we focus on indicators for undergraduate teacher preparation programs only. Please see Table D for a list of these indicator measures and NCTQ's *2014 Teacher Prep Review* for further detail on the overall program score, NCTQ standards, and the indicators for each standard.[13]

For our full teacher sample, and at the elementary and secondary levels, separately, Table E displays the mean and standard deviation for NCTQ's overall program score and standard scores. Additionally, Table E shows these same values post-imputation. Examining the non-imputed NCTQ data, the mean overall program score for teachers in the full sample is 51 (the lowest value for the Level II category), with nearly half of the teachers graduating from Level I rated programs. The overall program score differs by level, however, with elementary programs rated much lower than secondary programs. While the average score for a few NCTQ standards is relatively high (e.g. Selection Criteria, Assessment and Data, and Secondary Methods), more standards have an average score of one or less, including the key standards of Elementary Mathematics, Elementary Content, Middle School Content, and Student Teaching. Finally, the mean values for the imputed NCTQ data are very similar to those values from the non-imputed NCTQ data.

Covariates: To isolate the relationship between NCTQ's scores or indicators of teacher preparation programs and the teacher performance variables, we include a rich set of covariates in our value-added and evaluation rating analyses. In our value-added models we control for a set of student, classroom/teacher, and school characteristics. At the student level this includes students' prior year test scores in mathematics and reading; the average prior test scores of a student's peers; days absent; and indicators for race/ethnicity (black, Hispanic, Asian, American Indian, and multiracial), gender, subsidized lunch status (free lunch or reduced-price lunch), mobility (structural, within-year, between-year), giftedness, disability, limited English proficiency (both currently and previously qualifying), being underage or overage for grade, and for EOC exams, grade fixed effects. At the classroom/teacher level we control for class size, the heterogeneity of prior achievement within the classroom, indicators for advanced or remedial curriculum (for middle grades and EOC exams only), teaching out-of-field, and teacher experience (in analyses with both first and second-year teachers). At the school level we include measures of school size, school orderliness (the short-term suspension rate and violent acts rate), total per-pupil expenditures, average teacher salary supplements, the percentage of students who qualify for subsidized school lunches, and the percentage of black, Hispanic, Asian, American Indian, and multiracial students. In our evaluation rating analyses we control for teacher experience (in models with both first and second-year teachers) and the school characteristics included in our value-added models. Both the value-added and evaluation ratings models include a year fixed effect.

[13] Please see Tables 1-31 for results from value-added and evaluation rating indicator models using both case-wise deletion and multiple imputation methods.

Value-Added Analyses

To assess whether NCTQ's ratings of teacher preparation programs are associated with teachers' value-added to student achievement, we specified a covariate adjusted ordinary least squares (OLS) regression model with students' standardized test scores as the outcome and an extensive set of student, classroom/teacher, and school covariates. In these models we cluster-adjust the standard errors at the teacher level to account for the clustering of students within teachers and because the focal measure of interest is NCTQ's ratings of a teacher's preparation program (Koedel, Parsons, Podgursky, & Ehlert, 2012). For our *Program Score* models, coefficients indicate the adjusted-average difference in student achievement between graduates of Level I programs and graduates of either Level II, III, or IV programs; for our *Standards* models, coefficients indicate how a one point increase in a NCTQ standard score predicts adjusted-average student achievement; for our *Indicators* models, coefficients estimate the average difference in value-added of graduates whose programs were rated as having met versus not met the indicator requirements or how a one unit increase in an indicator measure predicts adjusted-average student achievement (adjusting for the other indicators and model covariates). As described above, our preferred models use multiple imputation to address missingness in the NCTQ data; we also estimate models that allow for case-wise deletion and models that include a dichotomous variable for missingness and replace missing values with a '0'.[14] The equation used to estimate the relationship between NCTQ's ratings of teacher preparation programs and teachers' value-added effectiveness is as follows:

$$A_{ijcst} = \alpha A_{it-n} + \beta NCTQ_j + \gamma X_{ijcst} + \delta C_{jcst} + \theta S_{st} + \varepsilon_{ijcst} \quad (1)$$

where A_{ijcst} is the test score for student *i* taught by teacher *j* in classroom *c* and school *s* at time *t;*

A_{it-n} represents the prior mathematics and reading test scores for student *i;*

β estimates the average effect of the NCTQ ratings from the *Program Score*, *Standards,* or *Indicators* models on students' adjusted-average test score growth;

$NCTQ_j$ represents the NCTQ preparation program rating variables from the *Program Score* models, the score for a single standard from the *Standards* models, or the indicator measures from the *Indicators* models;

X_{ijcst} represents a set of time-invariant and varying individual student characteristics;

[14] To show whether the missingness indicator variable was statistically significant we use color coding in the right panel of Tables F-N. If a cell has a result highlighted in green that indicates that the missingness indicator was positive and statistically significant. In other words, graduates from teacher preparation programs that were not rated on that standard (or the overall program score) are more effective than graduates from preparation programs that received an NCTQ rating. If a cell has a result highlighted in yellow that indicates that the missingness indicator was negative and statistically significant. In other words, graduates from teacher preparation programs that were not rated on that standard (or the overall program score) are less effective than graduates from preparation programs that received an NCTQ rating.

C_{jcst} represents a set of classroom and teacher characteristics;

S_{st} represents a set of school characteristics;

and ε_{ijcst} is a disturbance term for the unexplained variation in student achievement.

Given the non-random assignment of teachers to students and the influence of unmeasured school contextual factors on teacher performance, many value-added approaches include student or school fixed effects to mitigate internal validity threats (Bastian & Henry, 2014; Goldhaber, Liddle, & Theobald, 2013; Koedel et al., 2012). Due to the nature of our value-added sample—first and second-year teachers prepared at programs rated by NCTQ—typical fixed effects approaches may not be practical since few students experience these novice teachers in consecutive years in the same subject-area and few of these teachers work in the same schools.[15] For example, in a model for the NCTQ Selection Criteria standard for first-year middle grades mathematics teachers, 238 teachers contribute to the Selection Criteria coefficient in the OLS model; only 64 teachers contribute to the Selection Criteria coefficient in a school fixed effects model. Furthermore, by comparing teacher value-added to the mean effect for the school, rather than the population mean, school fixed effects remove substantial variation in teacher value-added estimates (McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2004). Therefore, we prefer to make teacher effectiveness comparisons across our full sample of tested-grades/subject-area teachers and rely upon our extensive set of student, classroom/teacher, and school covariates to isolate the relationships between NCTQ preparation program ratings and teacher value-added. This approach keeps as many observations of teachers from rated preparation programs as possible and increases the generalizability of our findings within NCPS. As a specification check, we use the multiple imputation data to estimate school fixed effects models. These results are available upon request.

Overall, these associations between NCTQ measures of preparation program quality and teachers' performance can be useful to identify aspects of teacher preparation programs that contribute to their graduates' performance and to provide feedback to preparation programs about potential reforms. In Tables F-N we provide the value-added coefficients using the estimation approach described above for each of the three methods of handling missing data.

Evaluation Rating Analyses

To complement our value-added models, we assess whether NCTQ's ratings of teacher preparation programs are associated with teachers' evaluation ratings from the NCEES. Teachers' evaluation ratings are an important and policy relevant indicator of their performance in public school classrooms, even though they are not as objective as value-added scores. Furthermore, since only 35 percent of North Carolina classroom teachers teach in a grade or subject-area with an End-of-Grade or End-of-Course exam, including these evaluation ratings allows us to include a larger sample of teachers from the preparation programs.

[15] The use of school fixed effects will also be limited in these analyses if schools (1) hire beginning teachers of the same quality (as rated by NCTQ's standards) and/or (2) hire beginning teachers from the same preparation program.

For these analyses we specified an ordered logistic regression for each of the five NCPTS, where the outcome variable is a teacher's 1-5 evaluation score (not demonstrated through distinguished) and we control for extensive school covariates. As in our value-added models, we cluster-adjust the standard errors at the teacher level. Coefficients from our *Program Score* model indicate the odds of rating higher on the NCEES for graduates of Level II, III, or IV programs in reference to graduates of Level I programs; coefficients from our *Standards* models indicate how a one point increase in a NCTQ standard score impact the odds of rating higher on the NCEES; coefficients from our *Indicators* models estimate the odds of rating higher on the NCEES for graduates of programs that were rated as having met versus not met the indicator requirements or for a one unit increase in an indicator measure (adjusting for the other indicators and model covariates). As with our value-added analyses, our preferred models use multiple imputation to address missingness in the NCTQ data; we also estimate models that allow for case-wise deletion and models that include a dichotomous variable for missingness and replace missing values with a '0'.[16] In Tables O-T we provide the evaluation rating coefficients using the estimation approach described above for each of the three methods of handling missing data. The equation used to estimate the relationship between NCTQ's ratings of teacher preparation programs and teachers' evaluation ratings is as follows:

$$Logit(C_{ij}) = \alpha_j - \beta NCTQ_i - \gamma X_i \quad (2)$$

where for each NCPTS C_{ij} is the cumulative probability that teacher *i* is in the *jth* category or higher;

α_j are the cutpoints from the ordered logit model;

β estimates the average effect of the NCTQ ratings from the *Program Score*, *Standards,* or *Indicators* models on the log-odds of evaluation ratings in a higher category;

$NCTQ_i$ represents a set of NCTQ preparation program ratings from the *Program Score*, *Standards,* or *Indicators* models;

and X_i represents a set of model covariates (school characteristics and teacher experience).

[16] To show whether the missingness indicator variable was statistically significant we use color coding in the right panel of Tables O-T. If a cell has a result highlighted in green that indicates that the missingness indicator was positive and statistically significant. If a cell has a result highlighted in yellow that indicates that the missingness indicator was negative and statistically significant.

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Appendix Tables

Table A: NCTQ Level and Teacher Route Data

NCTQ Level	Teacher Counts
Elementary Undergraduate	2,726
Elementary Graduate Degree	259
Secondary Undergraduate	1,160
Secondary Graduate Degree	368
Teacher Route	**Teacher Counts**
North Carolina Public University	3,052
North Carolina Private University	439
Out-of-State University	1,022
Total Number of Teachers in the Full Sample	**4,513**

Note: This table displays the NCTQ level and teacher route data for the 4,513 teachers in our full sample.

Table B: Availability of NCTQ Program and Standard Scores – Preparation Program Level

NCTQ Standard	Number of University Programs with NCTQ Data (Out of 781)	Number of Elementary Programs with NCTQ Data (Out of 394)	Number of Secondary Programs with NCTQ Data (Out of 387)
Overall Program Score	563	266	297
Selection Criteria	780	393	387
Early Reading	288	288	n/a
English Language Learners	229	229	n/a
Struggling Readers	238	238	n/a
Elementary Mathematics	315	315	n/a
Elementary Content	394	394	n/a
Middle School Content	149	n/a	149
High School Content	382	n/a	382
Classroom Management	410	200	210
Lesson Planning	257	124	133
Assessment and Data	277	135	142
Student Teaching	601	302	299
Secondary Methods	216	n/a	216
Outcomes	398	194	204

Note: This table displays counts for the number of teacher preparation programs, both overall and at the elementary and secondary levels, separately, for whom an NCTQ rating was available. N/A indicates 'not applicable' since NCTQ did not score the standard at that level.

Table C: Availability of NCTQ Program and Standard Scores – Teacher Level

NCTQ Program or Standard Score	Number of Teachers with NCTQ Data (Out of 4,513)	Number of Elementary Level Teachers with NCTQ Data (Out of 2,985)	Number of Secondary Level Teachers with NCTQ Data (Out of 1,528)
NCTQ Overall Program Score	4,120	2,684	1,436
Selection Criteria	4,510	2,982	1,528
Early Reading	2,745	2,745	n/a
English Language Learners	2,491	2,491	n/a
Struggling Readers	2,496	2,496	n/a
Elementary Mathematics	2,731	2,731	n/a
Elementary Content	2,985	2,985	n/a
Middle School Content	1,280	n/a	1,280
High School Content	1,518	n/a	1,518
Classroom Management	3,489	2,380	1,109
Lesson Planning	2,002	1,376	626
Assessment and Data	3,126	2,114	1,012
Student Teaching	4,215	2,779	1,436
Secondary Methods	1,267	n/a	1,267
Outcomes	3,809	2,458	1,351

Note: This table displays counts for the number of teachers, both overall and at the elementary and secondary levels, separately, for whom an NCTQ rating was available. N/A indicates 'not applicable' since NCTQ did not score the standard at that level.

Table D: NCTQ Indicator Measures

Selection Criteria	Elementary Mathematics	Classroom Management	Student Teaching	Outcomes
- Minimum GPA - GPA requirement of 3.0 or higher - Average GPA for the most recent incoming class is 3.3 or higher - Average incoming GPA - University mean SAT score - University mean ACT score - University or education school have SAT/ACT requirements that exceed 1120 (SAT) or 24 (ACT) - University or education school have SAT/ACT requirements exceed 1011 (SAT) or 21 (ACT) - Education school has SAT/ACT requirements - Education school uses additional admissions tests - Additional admissions test requirements meet or exceed the threshold score - Additional admissions test requirements meet or exceed the median score	- Total credit equivalent - Instructional score - School sufficiently selective - Math methods credits	The teacher preparation program assesses whether the teaching candidate is: - Able to establish expectations for behavior - Able to manage time - Able to manage materials - Able to maintain engagement - Able to manage the physical environment - Able to use praise - Able to manage minor student misbehavior - Aware of minor student misbehavior - Able to manage significant student misbehavior	- Number of required observations during student teaching - Student teaching observations conducted at regular intervals - The teacher preparation program requires cooperating teachers who are capable mentors - The teacher preparation program requires cooperating teachers who are proven effective instructors - The teacher preparation program gathers information regarding cooperating teachers' mentoring quality AND effectiveness - The teacher preparation program gathers information regarding cooperating teachers' mentoring quality OR effectiveness - The teacher preparation program gathers any substantive data	The teacher preparation program: - Surveys graduates - Surveys employers - Collects teacher performance assessment data - Collects student achievement/growth data - Collects data at least every three years

Note: Due to multicollinearity and a lack of variation in the indicator measures, in our value-added and evaluation rating analyses for the Selection standard we only examined indicator measures 1, 2, and 7 (for undergraduates only). For the remaining standards—Elementary Mathematics, Classroom Management, Student Teaching, and Outcomes—we included all available indicator measures in our value-added and evaluation rating models.

Table E: Mean and Standard Deviation of NCTQ Program and Standard Scores

NCTQ Measure	Mean and Standard Deviation of NCTQ Scores					
	Full Teacher Sample		Elementary Sample		Secondary Sample	
	With Missing Data	Imputed	With Missing Data	Imputed	With Missing Data	Imputed
NCTQ Program Score	51.501 (19.265)	51.356 (19.838)	46.662 (17.740)	46.392 (18.365)	60.546 (18.742)	61.052 (19.007)
Program Score Level I	0.479 (0.500)	0.479 (0.500)	0.622 (0.485)	0.619 (0.486)	0.212 (0.409)	0.207 (0.405)
Program Score Level II	0.348 (0.476)	0.339 (0.473)	0.250 (0.433)	0.251 (0.434)	0.529 (0.499)	0.510 (0.499)
Program Score Level III	0.129 (0.335)	0.132 (0.339)	0.123 (0.328)	0.120 (0.324)	0.140 (0.347)	0.158 (0.364)
Program Score Level IV	0.045 (0.207)	0.049 (0.216)	0.005 (0.069)	0.010 (0.099)	0.119 (0.324)	0.126 (0.332)
Selection Criteria	2.780 (1.454)	2.779 (1.454)	2.621 (1.483)	2.620 (1.483)	3.088 (1.344)	3.088 (1.343)
Early Reading	1.259 (1.673)	1.311 (1.713)	1.259 (1.673)	1.311 (1.713)	n/a	n/a
English Language Learners	1.023 (1.745)	0.983 (1.759)	1.023 (1.745)	0.983 (1.759)	n/a	n/a
Struggling Readers	0.505 (1.329)	0.489 (1.414)	0.505 (1.329)	0.489 (1.414)	n/a	n/a
Elementary Mathematics	0.852 (1.060)	0.887 (1.106)	0.852 (1.060)	0.887 (1.106)	n/a	n/a
Elementary Content	0.832 (0.829)	0.832 (0.829)	0.832 (0.829)	0.832 (0.829)	n/a	n/a
Middle School Content	1.016 (1.681)	1.322 (1.749)	n/a	n/a	1.016 (1.681)	1.322 (1.749)
High School Content	1.922 (1.189)	1.938 (1.202)	n/a	n/a	1.922 (1.189)	1.938 (1.202)
Classroom Management	2.030 (0.956)	1.708 (1.211)	2.108 (0.951)	1.814 (1.202)	1.861 (0.945)	1.501 (1.201)
Lesson Planning	1.856 (1.290)	1.702 (1.428)	1.849 (1.275)	1.846 (1.414)	1.872 (1.322)	1.421 (1.415)
Assessment and Data	2.517 (0.819)	2.365 (0.894)	2.574 (0.905)	2.377 (0.970)	2.396 (0.585)	2.344 (0.721)
Student Teaching	0.670 (1.039)	0.702 (1.069)	0.712 (1.064)	0.737 (1.089)	0.591 (0.983)	0.633 (1.025)
Secondary Methods	3.116 (1.130)	3.036 (1.275)	n/a	n/a	3.116 (1.130)	3.036 (1.275)
Outcomes	2.296 (1.475)	2.157 (1.511)	2.346 (1.470)	2.156 (1.523)	2.206 (1.481)	2.159 (1.487)

Note: This table displays the mean and standard deviation for the NCTQ overall program score and its four corresponding levels and each NCTQ standard score for the full teacher sample and elementary and secondary levels, separately. N/A indicates 'not applicable' since NCTQ did not score the standard at that level.

Table F: Value-Added NCTQ *Program Score* Models (Elementary and Middle)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st & 2nd Year	1st Year	1st & 2nd Year	1st Year	1st & 2nd Year
Elementary Grades Mathematics						
Level Two Program	0.008 (0.027)	-0.015 (0.023)	0.009 (0.026)	-0.010 (0.023)	0.007 (0.026)	-0.018 (0.023)
Level Three Program	0.036 (0.031)	0.028 (0.029)	0.038 (0.030)	0.032 (0.029)	0.037 (0.031)	0.029 (0.029)
Level Four Program	**0.355**** (0.038)	**0.258**** (0.033)	0.176 (0.176)	0.153 (0.126)	**0.333**** (0.037)	**0.249**** (0.032)
Cases	**21,402**	**28,789**	**24,295**	**32,376**	**24,295**	**32,376**
Elementary Grades Reading						
Level Two Program	0.010 (0.016)	0.000 (0.015)	0.010 (0.015)	0.001 (0.014)	0.012 (0.016)	0.001 (0.014)
Level Three Program	-0.006 (0.020)	-0.012 (0.017)	-0.004 (0.019)	-0.010 (0.017)	-0.004 (0.020)	-0.011 (0.017)
Level Four Program	**0.104**** (0.028)	-0.012 (0.038)	0.046 (0.076)	-0.010 (0.037)	**0.111**** (0.026)	-0.010 (0.038)
Cases	**24,105**	**32,645**	**26,935**	**35,991**	**26,935**	**35,991**
Middle Grades Mathematics						
Level Two Program	-0.039 (0.028)	-0.029 (0.026)	-0.043 (0.028)	-0.029 (0.026)	-0.038 (0.028)	-0.026 (0.026)
Level Three Program	0.024 (0.042)	0.016 (0.039)	0.008 (0.047)	0.009 (0.041)	0.019 (0.043)	0.012 (0.039)
Level Four Program	0.008 (0.052)	0.016 (0.049)	-0.002 (0.056)	0.010 (0.051)	0.006 (0.054)	0.014 (0.050)
Cases	**17,181**	**24,177**	**18,195**	**25,640**	**18,195**	**25,640**
Middle Grades Reading						
Level Two Program	0.011 (0.019)	-0.019 (0.017)	0.008 (0.019)	-0.023 (0.017)	0.011 (0.019)	-0.020 (0.017)
Level Three Program	0.009 (0.025)	-0.012 (0.019)	-0.003 (0.025)	-0.021 (0.021)	0.008 (0.024)	-0.012 (0.019)
Level Four Program	0.031 (0.027)	0.003 (0.026)	0.025 (0.027)	-0.004 (0.027)	0.032 (0.027)	0.003 (0.026)
Cases	**18,160**	**24,730**	**18,777**	**25,598**	**18,777**	**25,598**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.
Note: There was only one elementary grades teacher with a Level IV program score in the case-wise deletion analyses.

Table G: Value-Added NCTQ *Program Score* Models (EOC Exams)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Algebra I End-of-Course Exam						
Level Two Program	0.044 (0.042)	**0.072**+ (0.040)	0.042 (0.040)	**0.071**+ (0.039)	0.041 (0.041)	**0.073**+ (0.040)
Level Three Program	0.030 (0.064)	0.051 (0.057)	0.042 (0.066)	0.069 (0.058)	0.018 (0.060)	0.049 (0.055)
Level Four Program	0.057 (0.074)	0.052 (0.071)	0.060 (0.071)	0.067 (0.067)	0.062 (0.075)	0.063 (0.071)
Cases	**7,661**	**10,937**	**8,483**	**12,155**	**8,483**	**12,155**
Biology End-of-Course Exam						
Level Two Program	-0.063 (0.062)	-0.061 (0.053)	-0.067 (0.064)	-0.084 (0.057)	-0.063 (0.062)	-0.094 (0.058)
Level Three Program	0.045 (0.063)	0.053 (0.059)	0.024 (0.065)	0.033 (0.064)	0.045 (0.063)	0.022 (0.063)
Level Four Program	0.051 (0.071)	0.068 (0.075)	0.042 (0.076)	0.054 (0.079)	0.052 (0.071)	0.049 (0.075)
Cases	**4,721**	**7,119**	**4,846**	**7,405**	**4,846**	**7,405**
English I/II End-of-Course Exam						
Level Two Program	-0.003 (0.075)	**0.079**+ (0.046)	-0.009 (0.074)	0.072 (0.045)	-0.008 (0.075)	0.075 (0.046)
Level Three Program	-0.066 (0.081)	0.023 (0.049)	-0.060 (0.078)	0.027 (0.049)	-0.071 (0.081)	0.019 (0.049)
Level Four Program	-0.091 (0.077)	0.011 (0.051)	-0.089 (0.076)	0.010 (0.051)	-0.095 (0.077)	0.008 (0.051)
Cases	**6,279**	**8,921**	**6,546**	**9,228**	**6,546**	**9,228**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table H: Elementary Grades Mathematics Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**0.011**$^{+}$ (0.006)	0.007 (0.006)	0.010 (0.007)	0.007 (0.006)	0.011 (0.007)	0.007 (0.006)
Cases	**24,192**	**32,253**	**24,295**	**32,376**	**24,295**	**32,376**
Early Reading	0.006 (0.007)	0.009 (0.009)	0.004 (0.006)	0.007 (0.006)	0.005 (0.007)	0.009 (0.006)
Cases	**22,044**	**29,547**	**24,295**	**32,376**	**24,295**	**32,376**
English Language Learners	0.003 (0.007)	-0.004 (0.006)	0.003 (0.006)	-0.002 (0.006)	0.003 (0.007)	-0.004 (0.006)
Cases	**19,739**	**26,656**	**24,295**	**32,376**	**24,295**	**32,376**
Struggling Readers	0.006 (0.008)	0.007 (0.008)	0.004 (0.007)	0.005 (0.007)	0.007 (0.008)	0.008 (0.008)
Cases	**19,759**	**26,695**	**24,295**	**32,376**	**24,295**	**32,376**
Elementary Math	-0.010 (0.009)	-0.007 (0.008)	-0.009 (0.009)	-0.007 (0.008)	-0.010 (0.009)	-0.008 (0.008)
Cases	**21,958**	**29,402**	**24,295**	**32,376**	**24,295**	**32,376**
Elementary Content	-0.007 (0.014)	-0.007 (0.012)	-0.005 (0.014)	-0.005 (0.012)	-0.007 (0.014)	-0.007 (0.012)
Cases	**24,235**	**32,293**	**24,295**	**32,376**	**24,295**	**32,376**
Management	0.005 (0.012)	0.004 (0.011)	0.006 (0.008)	0.008 (0.008)	0.006 (0.012)	0.005 (0.011)
Cases	**18,147**	**24,385**	**24,295**	**32,376**	**24,295**	**32,376**
Planning	-0.005 (0.012)	0.003 (0.011)	0.002 (0.008)	0.003 (0.007)	-0.004 (0.012)	0.003 (0.011)
Cases	**10,206**	**13,546**	**24,295**	**32,376**	**24,295**	**32,376**
Assessment	0.017 (0.013)	**0.021**$^{+}$ (0.011)	0.014 (0.011)	**0.018**$^{+}$ (0.010)	0.020 (0.013)	**0.024*** (0.012)
Cases	**16,157**	**21,777**	**24,295**	**32,376**	**24,295**	**32,376**
Student Teaching	-0.000 (0.010)	0.007 (0.009)	-0.001 (0.009)	0.006 (0.009)	-0.000 (0.010)	0.008 (0.009)
Cases	**22,303**	**29,865**	**24,295**	**32,376**	**24,295**	**32,376**
Outcomes	0.008 (0.008)	0.009 (0.007)	0.007 (0.007)	0.008 (0.006)	0.008 (0.008)	0.011 (0.007)
Cases	**19,198**	**25,698**	**24,295**	**32,376**	**24,295**	**32,376**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table I: Elementary Grades Reading Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	0.005 (0.005)	0.001 (0.004)	0.005 (0.005)	0.001 (0.004)	0.005 (0.005)	0.001 (0.004)
Cases	**26,891**	**35,927**	**26,935**	**35,991**	**26,935**	**35,991**
Early Reading	0.002 (0.004)	0.001 (0.004)	0.002 (0.004)	0.001 (0.003)	0.002 (0.004)	0.002 (0.003)
Cases	**24,541**	**32,995**	**26,935**	**35,991**	**26,935**	**35,991**
English Language Learners	-0.001 (0.004)	-0.002 (0.004)	0.000 (0.004)	-0.001 (0.003)	-0.000 (0.004)	-0.001 (0.004)
Cases	**22,140**	**30,079**	**26,935**	**35,991**	**26,935**	**35,991**
Struggling Readers	-0.004 (0.006)	-0.004 (0.005)	-0.001 (0.005)	-0.002 (0.004)	-0.004 (0.006)	-0.004 (0.005)
Cases	**22,160**	**30,118**	**26,935**	**35,991**	**26,935**	**35,991**
Elementary Math	-0.004 (0.007)	-0.004 (0.006)	-0.003 (0.006)	-0.004 (0.005)	-0.004 (0.007)	-0.004 (0.006)
Cases	**24,588**	**32,983**	**26,935**	**35,991**	**26,935**	**35,991**
Elementary Content	-0.013 (0.008)	**-0.013**+ (0.007)	-0.012 (0.008)	**-0.012**+ (0.007)	-0.013 (0.008)	**-0.013**+ (0.007)
Cases	**26,858**	**35,749**	**26,935**	**35,991**	**26,935**	**35,991**
Management	0.004 (0.007)	0.003 (0.006)	0.005 (0.005)	0.003 (0.005)	0.003 (0.007)	0.002 (0.006)
Cases	**21,113**	**28,446**	**26,935**	**35,991**	**26,935**	**35,991**
Planning	0.003 (0.007)	0.001 (0.006)	0.008 (0.008)	0.003 (0.004)	0.004 (0.007)	0.001 (0.006)
Cases	**11,690**	**15,723**	**26,935**	**35,991**	**26,935**	**35,991**
Assessment	0.011 (0.008)	0.009 (0.006)	**0.015*** (0.007)	**0.013*** (0.006)	0.011 (0.008)	0.010 (0.006)
Cases	**18,565**	**24,867**	**26,935**	**35,991**	**26,935**	**35,991**
Student Teaching	-0.005 (0.006)	-0.001 (0.005)	-0.005 (0.006)	-0.001 (0.005)	-0.005 (0.006)	-0.002 (0.005)
Cases	**24,915**	**33,630**	**26,935**	**35,991**	**26,935**	**35,991**
Outcomes	0.004 (0.005)	0.006 (0.004)	0.005 (0.004)	**0.006**+ (0.004)	0.004 (0.005)	**0.007**+ (0.004)
Cases	**21,974**	**29,511**	**26,935**	**35,991**	**26,935**	**35,991**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table J: Middle Grades Mathematics Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	-0.016 (0.010)	-0.008 (0.009)	-0.016 (0.010)	-0.008 (0.009)	-0.016 (0.010)	-0.008 (0.009)
Cases	**18,195**	**25,640**	**18,195**	**25,640**	**18,195**	**25,640**
Content	**-0.019*** (0.009)	**-0.014**$^{+}$ (0.008)	**-0.015**$^{+}$ (0.009)	-0.011 (0.008)	**-0.019*** (0.009)	**-0.014**$^{+}$ (0.008)
Cases	**17,600**	**24,889**	**18,195**	**25,640**	**18,195**	**25,640**
Management	**0.038**** (0.014)	**0.026**$^{+}$ (0.014)	0.021 (0.013)	0.017 (0.011)	**0.037*** (0.014)	**0.025**$^{+}$ (0.014)
Cases	**14,518**	**19,942**	**18,195**	**25,640**	**18,195**	**25,640**
Planning	**-0.028*** (0.013)	**-0.025*** (0.012)	-0.017 (0.011)	-0.014 (0.010)	**-0.027*** (0.013)	**-0.026*** (0.012)
Cases	**9,978**	**13,102**	**18,195**	**25,640**	**18,195**	**25,640**
Assessment	0.011 (0.022)	-0.013 (0.021)	0.007 (0.022)	-0.005 (0.020)	0.014 (0.023)	-0.014 (0.023)
Cases	**12,258**	**17,407**	**18,195**	**25,640**	**18,195**	**25,640**
Student Teaching	**0.036**** (0.013)	**0.025*** (0.012)	**0.035*** (0.014)	**0.025*** (0.012)	**0.036**** (0.013)	**0.025*** (0.012)
Cases	**17,419**	**24,596**	**18,195**	**25,640**	**18,195**	**25,640**
Secondary Methods	0.017 (0.023)	0.020 (0.017)	0.003 (0.013)	0.010 (0.010)	0.019 (0.023)	0.020 (0.017)
Cases	**12,062**	**17,117**	**18,195**	**25,640**	**18,195**	**25,640**
Outcomes	**0.023**** (0.008)	**0.017*** (0.008)	**0.023*** (0.009)	**0.017*** (0.008)	**0.022**** (0.008)	**0.015**$^{+}$ (0.008)
Cases	**16,477**	**23,007**	**18,195**	**25,640**	**18,195**	**25640**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table K: Middle Grades Reading Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**0.014*** (0.006)	0.001 (0.005)	**0.014*** (0.006)	0.001 (0.005)	**0.014*** (0.006)	0.001 (0.005)
Cases	**18,780**	**25,602**	**18,780**	**25,602**	**18,780**	**25,602**
Content	-0.003 (0.005)	-0.001 (0.004)	-0.002 (0.005)	-0.001 (0.004)	-0.003 (0.005)	-0.001 (0.004)
Cases	**18,464**	**25,054**	**18,780**	**25,602**	**18,780**	**25,602**
Management	0.004 (0.008)	0.010 (0.008)	0.001 (0.007)	0.006 (0.007)	0.004 (0.008)	0.010 (0.008)
Cases	**14,464**	**19,872**	**18,780**	**25,602**	**18,780**	**25,602**
Planning	-0.006 (0.008)	-0.006 (0.006)	-0.002 (0.006)	0.001 (0.006)	-0.004 (0.008)	-0.004 (0.007)
Cases	**9,695**	**12,708**	**18,780**	**25,602**	**18,780**	**25,602**
Assessment	0.019 (0.012)	0.015 (0.012)	**0.021**+ (0.012)	0.017 (0.011)	**0.020**+ (0.012)	0.014 (0.011)
Cases	**12,729**	**17,145**	**18,780**	**25,602**	**18,780**	**25,602**
Student Teaching	0.002 (0.008)	-0.001 (0.008)	0.000 (0.008)	-0.003 (0.008)	0.002 (0.008)	-0.000 (0.008)
Cases	**18,276**	**24,935**	**18,780**	**25,602**	**18,780**	**25,602**
Secondary Methods	-0.005 (0.010)	0.007 (0.008)	0.005 (0.006)	0.009 (0.006)	-0.003 (0.010)	0.007 (0.008)
Cases	**13,034**	**17,442**	**18,780**	**25,602**	**18,780**	**25,602**
Outcomes	0.000 (0.005)	0.007 (0.004)	0.004 (0.005)	**0.008**+ (0.005)	0.001 (0.005)	**0.007**+ (0.004)
Cases	**16,836**	**22,924**	**18,780**	**25,602**	**18,780**	**25,602**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table L: Algebra I EOC Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**0.027*** (0.012)	**0.025*** (0.010)	**0.027*** (0.012)	**0.025*** (0.010)	**0.027*** (0.012)	**0.025*** (0.010)
Cases	**8,483**	**12,155**	**8,483**	**12,155**	**8,483**	**12,155**
High School Content	-0.004 (0.016)	0.002 (0.016)	-0.007 (0.015)	-0.003 (0.015)	-0.005 (0.015)	0.001 (0.016)
Cases	**8,271**	**11,753**	**8,483**	**12,155**	**8,483**	**12,155**
Management	**0.041+** (0.023)	0.024 (0.021)	0.009 (0.017)	-0.003 (0.016)	**0.047*** (0.023)	0.031 (0.021)
Cases	**5,440**	**7,916**	**8,483**	**12,155**	**8,483**	**12,155**
Planning	**0.050**** (0.015)	**0.032+** (0.016)	0.000 (0.013)	-0.008 (0.011)	**0.036*** (0.015)	0.027 (0.017)
Cases	**3,194**	**4,037**	**8,483**	**12,155**	**8,483**	**12,155**
Assessment	0.003 (0.034)	0.023 (0.029)	0.001 (0.027)	-0.001 (0.025)	-0.013 (0.036)	-0.003 (0.033)
Cases	**5,510**	**7,994**	**8,483**	**12,155**	**8,483**	**12,155**
Student Teaching	-0.027 (0.020)	-0.023 (0.018)	-0.011 (0.021)	-0.011 (0.018)	-0.027 (0.020)	-0.025 (0.017)
Cases	**7,661**	**10,937**	**8,483**	**12,155**	**8,483**	**12,155**
Secondary Methods	**0.048*** (0.019)	**0.036*** (0.014)	0.019 (0.014)	0.016 (0.012)	**0.043*** (0.018)	**0.034*** (0.014)
Cases	**6,758**	**9,560**	**8483**	**12,155**	**8,483**	**12,155**
Outcomes	**0.023*** (0.012)	**0.021+** (0.011)	**0.024*** (0.011)	**0.020+** (0.010)	**0.023*** (0.011)	**0.021*** (0.011)
Cases	**7,291**	**10,351**	**8,483**	**12,155**	**8,483**	**12,155**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table M: Biology I EOC Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection	-0.017 (0.020)	-0.016 (0.021)	-0.017 (0.020)	-0.016 (0.021)	-0.017 (0.020)	-0.016 (0.021)
Cases	**4,846**	**7,405**	**4,846**	**7,405**	**4,846**	**7,405**
High School Content	0.007 (0.018)	0.013 (0.018)	0.007 (0.018)	0.013 (0.018)	0.007 (0.018)	0.013 (0.018)
Cases	**4,846**	**7,405**	**4,846**	**7,405**	**4,846**	**7,405**
Management	-0.004 (0.033)	0.010 (0.038)	-0.012 (0.025)	-0.012 (0.021)	-0.008 (0.033)	-0.005 (0.037)
Cases	**3,501**	**5,205**	**4,846**	**7,405**	**4,846**	**7,405**
Planning	0.010 (0.028)	0.006 (0.023)	0.012 (0.024)	0.004 (0.024)	-0.006 (0.030)	-0.025 (0.032)
Cases	**1,972**	**3,078**	**4,846**	**7,405**	**4,846**	**7,405**
Assessment	**-0.175**** (0.046)	**-0.173**** (0.049)	**-0.089**$^{+}$ (0.048)	**-0.089**$^{+}$ (0.051)	**-0.149**** (0.047)	**-0.158**** (0.051)
Cases	**3,508**	**5,454**	**4,846**	**7,405**	**4,846**	**7,405**
Student Teaching	0.013 (0.027)	0.017 (0.023)	0.005 (0.028)	0.012 (0.025)	0.013 (0.027)	0.008 (0.024)
Cases	**4,721**	**7,119**	**4,846**	**7,405**	**4,846**	**7,405**
Secondary Methods	-0.008 (0.023)	-0.002 (0.027)	-0.012 (0.023)	-0.010 (0.027)	-0.002 (0.022)	0.006 (0.028)
Cases	**3,975**	**6,076**	**4,846**	**7,405**	**4,846**	**7,405**
Outcomes	-0.006 (0.021)	0.005 (0.024)	-0.015 (0.022)	0.000 (0.026)	-0.009 (0.022)	0.003 (0.025)
Cases	**4,302**	**6,456**	**4,846**	**7,405**	**4,846**	**7,405**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table N: English I/II EOC Value-Added *Standards* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	0.003 (0.013)	0.001 (0.013)	0.003 (0.013)	0.001 (0.013)	0.003 (0.013)	0.001 (0.013)
Cases	**6,546**	**9,228**	**6,546**	**9,228**	**6,546**	**9,228**
High School Content	-0.007 (0.010)	0.005 (0.009)	-0.007 (0.010)	0.005 (0.009)	-0.007 (0.010)	0.005 (0.009)
Cases	**6,496**	**9,178**	**6,546**	**9,228**	**6,546**	**9,228**
Management	-0.011 (0.015)	-0.016 (0.013)	-0.017 (0.012)	-0.016 (0.011)	-0.009 (0.016)	-0.011 (0.013)
Cases	**5,218**	**7,339**	**6,546**	**9,228**	**6,546**	**9,228**
Planning	0.034 (0.020)	0.012 (0.022)	0.004 (0.013)	0.006 (0.011)	0.032 (0.019)	0.029 (0.018)
Cases	**2,264**	**3,099**	**6,546**	**9,228**	**6,546**	**9,228**
Assessment	-0.035 (0.030)	-0.048 (0.031)	-0.033 (0.027)	-0.036 (0.024)	**-0.055**$^{+}$ (0.033)	**-0.056**$^{+}$ (0.032)
Cases	**4,611**	**6,466**	**6,546**	**9,228**	**6,546**	**9,228**
Student Teaching	**-0.036**** (0.012)	**-0.021**$^{+}$ (0.012)	**-0.030*** (0.013)	-0.018 (0.012)	**-0.036**** (0.012)	**-0.021**$^{+}$ (0.012)
Cases	**6,279**	**8,921**	**6,546**	**9,228**	**6,546**	**9,228**
Secondary Methods	0.010 (0.018)	0.004 (0.015)	-0.003 (0.016)	-0.005 (0.011)	0.004 (0.017)	0.002 (0.015)
Cases	**5,099**	**7,026**	**6,546**	**9,228**	**6,546**	**9,228**
Outcomes	-0.014 (0.009)	-0.013 (0.009)	-0.013 (0.009)	-0.012 (0.009)	-0.014 (0.009)	-0.012 (0.009)
Cases	**6,241**	**8,811**	**6,546**	**9,228**	**6,546**	**9,228**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table O: Evaluation Rating NCTQ *Program Score* Models

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Standard 1: Leadership						
Level Two Program	1.133 (0.176)	1.120 (0.168)	1.156 (0.113)	1.135 (0.118)	1.138 (0.167)	1.114 (0.191)
Level Three Program	1.087 (0.498)	1.097 (0.396)	1.124 (0.331)	1.135 (0.231)	1.093 (0.476)	1.095 (0.406)
Level Four Program	1.132 (0.493)	1.025 (0.888)	1.161 (0.397)	1.058 (0.736)	1.136 (0.486)	1.013 (0.943)
Cases	**3,573**	**4,951**	**3,890**	**5,373**	**3,890**	**5,373**
Standard 2: Classroom Environment						
Level Two Program	1.151 (0.101)	**1.194*** (0.023)	**1.158+** (0.084)	**1.192*** (0.022)	1.150 (0.107)	**1.189*** (0.028)
Level Three Program	1.039 (0.732)	1.041 (0.695)	1.066 (0.565)	1.067 (0.512)	1.043 (0.710)	1.041 (0.692)
Level Four Program	1.045 (0.808)	1.150 (0.407)	1.055 (0.753)	1.139 (0.409)	1.050 (0.787)	1.148 (0.416)
Cases	**3,573**	**4,950**	**3,890**	**5,372**	**3,890**	**5,372**
Standard 3: Content Knowledge						
Level Two Program	1.141 (0.161)	**1.234*** (0.013)	1.131 (0.184)	**1.210*** (0.021)	1.136 (0.176)	**1.223*** (0.017)
Level Three Program	1.025 (0.841)	1.057 (0.612)	1.053 (0.668)	1.083 (0.462)	1.026 (0.835)	1.054 (0.631)
Level Four Program	1.239 (0.228)	**1.408+** (0.050)	1.236 (0.232)	**1.355+** (0.076)	1.248 (0.212)	**1.409*** (0.049)
Cases	**3,573**	**4,950**	**3,890**	**5,372**	**3,890**	**5,372**
Standard 4: Facilitating Student Learning						
Level Two Program	1.109 (0.224)	**1.163+** (0.053)	1.127 (0.157)	**1.170*** (0.041)	1.111 (0.218)	**1.155+** (0.066)
Level Three Program	1.084 (0.488)	1.061 (0.574)	1.132 (0.280)	1.106 (0.328)	1.088 (0.468)	1.058 (0.592)
Level Four Program	0.994 (0.975)	1.067 (0.725)	1.062 (0.737)	1.105 (0.556)	0.997 (0.988)	1.056 (0.764)
Cases	**3,572**	**4,950**	**3,889**	**5,372**	**3,889**	**5,372**
Standard 5: Reflecting on Practice						
Level Two Program	**1.181+** (0.066)	**1.182*** (0.042)	**1.172+** (0.075)	**1.172+** (0.051)	**1.181+** (0.068)	**1.177+** (0.050)
Level Three Program	1.007 (0.956)	0.951 (0.636)	1.018 (0.878)	0.962 (0.709)	1.007 (0.954)	0.948 (0.617)
Level Four Program	**1.396+** (0.052)	1.257 (0.152)	**1.384*** (0.049)	1.230 (0.178)	**1.401+** (0.051)	1.252 (0.162)
Cases	**3,573**	**4,950**	**3,890**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table P: Evaluation Rating NCTQ *Standards* Models (Leadership)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**1.050**+ (0.063)	**1.049*** (0.046)	**1.050**+ (0.062)	**1.049*** (0.044)	**1.050**+ (0.063)	**1.049*** (0.046)
Cases	**3,887**	**5,369**	**3,890**	**5,373**	**3,890**	**5,373**
Early Reading	**1.054**+ (0.074)	1.026 (0.328)	1.045 (0.129)	1.019 (0.464)	**1.057**+ (0.068)	1.028 (0.300)
Cases	**2,378**	**3,240**	**2,572**	**3,499**	**2,572**	**3,499**
English Language Learners	**1.072*** (0.024)	**1.065*** (0.022)	**1.055**+ (0.077)	**1.050**+ (0.064)	**1.074*** (0.025)	**1.063*** (0.030)
Cases	**2,174**	**2,975**	**2,572**	**3,499**	**2,572**	**3,499**
Struggling Readers	1.039 (0.329)	0.999 (0.977)	1.024 (0.513)	0.996 (0.892)	1.042 (0.306)	0.999 (0.989)
Cases	**2,178**	**2,981**	**2,572**	**3,499**	**2,572**	**3499**
Elementary Math	0.941 (0.152)	0.946 (0.160)	0.958 (0.315)	0.963 (0.347)	0.937 (0.136)	0.942 (0.142)
Cases	**2,362**	**3,225**	**2572**	**3499**	**2572**	**3499**
Elementary Content	**1.162*** (0.010)	**1.163**** (0.003)	**1.162*** (0.010)	**1.163**** (0.003)	**1.162*** (0.010)	**1.163**** (0.003)
Cases	**2572**	**3499**	**2,572**	**3,499**	**2,572**	**3,499**
Middle School Content	**0.845*** (0.010)	**0.891*** (0.043)	**0.877*** (0.036)	**0.905**+ (0.066)	**0.856*** (0.013)	**0.901**+ (0.052)
Cases	**434**	**629**	**482**	**701**	**482**	**701**
High School Content	0.910 (0.210)	0.916 (0.186)	0.910 (0.203)	0.915 (0.178)	0.909 (0.209)	0.915 (0.185)
Cases	**832**	**1169**	**836**	**1173**	**836**	**1173**
Management	1.000 (0.983)	0.986 (0.727)	**0.922*** (0.018)	**0.924*** (0.011)	1.001 (0.981)	0.987 (0.733)
Cases	**3,047**	**4,194**	**3,890**	**5,373**	**3,890**	**5,373**
Planning	0.998 (0.967)	1.039 (0.371)	**0.933*** (0.033)	0.954 (0.104)	0.973 (0.546)	1.009 (0.824)
Cases	**1,754**	**2,400**	**3,890**	**5,373**	**3,890**	**5,373**
Assessment	0.951 (0.382)	0.951 (0.312)	1.010 (0.833)	1.015 (0.731)	0.949 (0.365)	0.949 (0.302)
Cases	**2,757**	**3,805**	**3,890**	**5,373**	**3,890**	**5,373**
Student Teaching	0.987 (0.720)	1.006 (0.850)	0.988 (0.727)	1.008 (0.793)	0.984 (0.682)	1.005 (0.867)
Cases	**3,646**	**5,046**	**3,890**	**5,373**	**3,890**	**5,373**
Secondary Methods	1.062 (0.408)	1.045 (0.482)	1.036 (0.548)	1.029 (0.579)	1.071 (0.329)	1.049 (0.429)
Cases	**1,109**	**1,571**	**1,318**	**1,874**	**1,318**	**1,874**
Outcomes	1.023 (0.404)	1.019 (0.425)	1.019 (0.451)	1.022 (0.327)	1.025 (0.367)	1.021 (0.396)
Cases	**3,331**	**4,608**	**3,890**	**5,373**	**3,890**	**5,373**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table Q: Evaluation Rating NCTQ Standards Models (Classroom Environment)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	1.031 (0.204)	**1.046*** (0.042)	1.031 (0.216)	**1.045*** (0.047)	1.032 (0.206)	**1.046*** (0.043)
Cases	**3,887**	**5,368**	**3,890**	**5,372**	**3,890**	**5,372**
Early Reading	1.032 (0.238)	1.021 (0.396)	1.025 (0.332)	1.017 (0.477)	1.034 (0.225)	1.022 (0.366)
Cases	**2,378**	**3,239**	**2,572**	**3,498**	**2,572**	**3,498**
English Language Learners	**1.080**** (0.005)	**1.091**** (0.001)	**1.057**+ (0.053)	**1.063*** (0.020)	**1.080**** (0.006)	**1.089**** (0.001)
Cases	**2,174**	**2,974**	**2,572**	**3,498**	**2,572**	**3,498**
Struggling Readers	1.003 (0.942)	0.989 (0.727)	0.993 (0.833)	0.982 (0.544)	1.006 (0.872)	0.992 (0.794)
Cases	**2,178**	**2,980**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Math	0.949 (0.224)	0.957 (0.253)	0.960 (0.314)	0.969 (0.407)	0.944 (0.184)	0.952 (0.212)
Cases	**2,362**	**3,224**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Content	**1.104**+ (0.057)	**1.085**+ (0.084)	**1.104**+ (0.057)	**1.085**+ (0.085)	**1.104**+ (0.057)	**1.085**+ (0.084)
Cases	**2,572**	**3,498**	**2,572**	**3,498**	**2,572**	**3,498**
Middle School Content	**0.841**** (0.009)	**0.889*** (0.044)	**0.852*** (0.011)	**0.876*** (0.017)	**0.846**** (0.008)	**0.884*** (0.028)
Cases	**434**	**629**	**482**	**701**	**482**	**701**
High School Content	0.991 (0.897)	1.009 (0.882)	0.988 (0.860)	1.006 (0.918)	0.990 (0.894)	1.009 (0.885)
Cases	**832**	**1,169**	**836**	**1,173**	**836**	**1,173**
Management	0.997 (0.937)	0.997 (0.937)	**0.917**** (0.008)	**0.914**** (0.002)	0.993 (0.866)	0.995 (0.900)
Cases	**3,047**	**4,193**	**3,890**	**5,372**	**3,890**	**5,372**
Planning	1.041 (0.369)	1.062 (0.139)	0.962 (0.203)	0.965 (0.227)	1.011 (0.787)	1.025 (0.521)
Cases	**1,754**	**2,400**	**3,890**	**5,372**	**3,890**	**5,372**
Assessment	1.007 (0.880)	0.963 (0.404)	1.022 (0.624)	1.007 (0.860)	1.006 (0.908)	0.957 (0.339)
Cases	**2,757**	**3,804**	**3,890**	**5,372**	**3,890**	**5,372**
Student Teaching	1.021 (0.533)	1.018 (0.569)	1.021 (0.534)	1.020 (0.522)	1.022 (0.534)	1.018 (0.570)
Cases	**3,646**	**5,045**	**3,890**	**5,372**	**3,890**	**5,372**
Secondary Methods	**1.123**+ (0.085)	**1.149*** (0.014)	1.099 (0.122)	**1.122*** (0.025)	**1.128**+ (0.069)	**1.152*** (0.012)
Cases	**1,109**	**1,571**	**1,318**	**1,874**	**1,318**	**1,874**
Outcomes	**1.046**+ (0.082)	**1.047*** (0.044)	1.029 (0.235)	1.035 (0.103)	**1.047**+ (0.072)	**1.049*** (0.038)
Cases	**3,331**	**4,607**	**3,890**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table R: Evaluation Rating NCTQ *Standards* Models (Content Knowledge)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	1.039 (0.166)	**1.052*** (0.035)	1.039 (0.166)	**1.052*** (0.037)	1.039 (0.166)	**1.053*** (0.035)
Cases	**3,887**	**5,368**	**3,890**	**5,372**	**3,890**	**5,372**
Early Reading	1.022 (0.465)	0.999 (0.958)	1.015 (0.594)	0.997 (0.904)	1.022 (0.471)	0.999 (0.980)
Cases	**2,378**	**3,239**	**2,572**	**3,498**	**2,572**	**3,498**
English Language Learners	1.049 (0.112)	**1.071*** (0.014)	1.028 (0.357)	**1.047+** (0.087)	1.045 (0.145)	**1.067*** (0.022)
Cases	**2,174**	**2,974**	**2,572**	**3,498**	**2,572**	**3,498**
Struggling Readers	0.983 (0.642)	0.968 (0.307)	0.973 (0.429)	0.966 (0.244)	0.984 (0.672)	0.968 (0.317)
Cases	**2,178**	**2,980**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Math	0.966 (0.432)	0.979 (0.615)	0.971 (0.490)	0.983 (0.666)	0.964 (0.405)	0.977 (0.581)
Cases	**2,362**	**3,224**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Content	**1.114+** (0.073)	**1.115*** (0.043)	**1.114+** (0.073)	**1.115*** (0.044)	**1.114+** (0.073)	**1.115*** (0.043)
Cases	**2,572**	**3,498**	**2,572**	**3,498**	**2,572**	**3,498**
Middle School Content	**0.787**** (0.001)	**0.844**** (0.006)	**0.808**** (0.002)	**0.835**** (0.002)	**0.797**** (0.001)	**0.841**** (0.003)
Cases	**434**	**629**	**482**	**701**	**482**	**701**
High School Content	0.893 (0.136)	0.931 (0.285)	0.890 (0.117)	0.928 (0.263)	0.893 (0.135)	0.930 (0.284)
Cases	**832**	**1169**	**836**	**1173**	**836**	**1173**
Management	0.956 (0.319)	0.958 (0.285)	**0.886**** (0.001)	**0.894**** (0.001)	0.954 (0.288)	0.957 (0.266)
Cases	**3,047**	**4,198**	**3,890**	**5,372**	**3,890**	**5,372**
Planning	1.049 (0.309)	1.069 (0.123)	0.952 (0.156)	0.956 (0.172)	1.022 (0.624)	1.037 (0.369)
Cases	**1,754**	**2,400**	**3,890**	**5,372**	**3,890**	**5,372**
Assessment	0.949 (0.349)	**0.920+** (0.085)	1.007 (0.898)	1.004 (0.931)	0.953 (0.379)	**0.921+** (0.089)
Cases	**2,757**	**3,804**	**3,890**	**5,372**	**3,890**	**5,372**
Student Teaching	1.007 (0.846)	1.009 (0.784)	1.010 (0.777)	1.014 (0.681)	1.006 (0.862)	1.009 (0.776)
Cases	**3,646**	**5,045**	**3,890**	**5,372**	**3,890**	**5,372**
Secondary Methods	**1.150+** (0.057)	**1.133*** (0.043)	1.086 (0.193)	**1.108+** (0.051)	**1.155*** (0.048)	**1.138*** (0.033)
Cases	**1,109**	**1,571**	**1,318**	**1,874**	**1,318**	**1,874**
Outcomes	1.008 (0.757)	1.012 (0.633)	1.009 (0.720)	1.019 (0.411)	1.009 (0.732)	1.013 (0.616)
Cases	**3,331**	**4,607**	**3,890**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table S: Evaluation Rating NCTQ *Standards* Models (Facilitating Student Learning)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**1.063*** (0.013)	**1.071**** (0.002)	**1.062*** (0.015)	**1.070**** (0.003)	**1.063*** (0.013)	**1.071**** (0.002)
Cases	**3,886**	**5,368**	**3,889**	**5,372**	**3,889**	**5,372**
Early Reading	1.009 (0.724)	1.002 (0.934)	1.003 (0.895)	0.998 (0.923)	1.011 (0.696)	1.003 (0.886)
Cases	**2,378**	**3,240**	**2,572**	**3,499**	**2,572**	**3,499**
English Language Learners	**1.062*** (0.026)	**1.077**** (0.004)	1.046 (0.106)	**1.058*** (0.024)	**1.064*** (0.028)	**1.076**** (0.005)
Cases	**2,174**	**2,975**	**2,572**	**3,499**	**2,572**	**3,499**
Struggling Readers	1.003 (0.919)	0.984 (0.587)	0.994 (0.859)	0.981 (0.513)	1.005 (0.873)	0.985 (0.632)
Cases	**2,178**	**2,981**	**2,572**	**3,499**	**2,572**	**3,499**
Elementary Math	0.958 (0.309)	0.979 (0.604)	0.971 (0.484)	0.991 (0.808)	0.955 (0.279)	0.977 (0.560)
Cases	**2,362**	**3,225**	**2,572**	**3,499**	**2,572**	**3,499**
Elementary Content	1.091 (0.109)	**1.097**$^{+}$ (0.061)	1.091 (0.109)	**1.097**$^{+}$ (0.061)	1.091 (0.109)	**1.097**$^{+}$ (0.061)
Cases	**2,572**	**3,499**	**2,572**	**3,499**	**2,572**	**3,499**
Middle School Content	**0.889**$^{+}$ (0.077)	**0.907**$^{+}$ (0.099)	**0.895**$^{+}$ (0.077)	**0.896**$^{+}$ (0.050)	**0.882**$^{+}$ (0.058)	**0.900**$^{+}$ (0.069)
Cases	**434**	**629**	**482**	**701**	**482**	**701**
High School Content	**0.883**$^{+}$ (0.093)	0.916 (0.175)	**0.882**$^{+}$ (0.082)	0.914 (0.161)	**0.882**$^{+}$ (0.092)	0.915 (0.174)
Cases	**831**	**1168**	**835**	**1172**	**835**	**1172**
Management	0.977 (0.581)	0.978 (0.579)	**0.910**** (0.006)	**0.907**** (0.002)	0.976 (0.571)	0.979 (0.597)
Cases	**3,046**	**4,193**	**3,889**	**5,372**	**3,889**	**5,372**
Planning	0.981 (0.677)	1.019 (0.637)	**0.937*** (0.045)	**0.949**$^{+}$ (0.093)	0.962 (0.358)	0.987 (0.737)
Cases	**1,753**	**2,399**	**3,889**	**5,372**	**3,889**	**5,372**
Assessment	0.931 (0.166)	**0.919**$^{+}$ (0.068)	0.998 (0.967)	1.001 (0.976)	0.935 (0.189)	**0.923**$^{+}$ (0.080)
Cases	**2,756**	**3,804**	**3,889**	**5,372**	**3,889**	**5,372**
Student Teaching	1.012 (0.726)	1.008 (0.795)	1.015 (0.656)	1.013 (0.673)	1.010 (0.765)	1.008 (0.806)
Cases	**3,645**	**5,045**	**3,889**	**5,372**	**3,889**	**5,372**
Secondary Methods	**1.162*** (0.022)	**1.186**** (0.004)	**1.106**$^{+}$ (0.064)	**1.120*** (0.028)	**1.179*** (0.011)	**1.201**** (0.002)
Cases	**1,108**	**1,570**	**1,317**	**1,873**	**1,317**	**1,873**
Outcomes	1.017 (0.504)	1.012 (0.609)	1.022 (0.375)	1.019 (0.392)	1.020 (0.444)	1.013 (0.569)
Cases	**3,330**	**4,607**	**3,889**	**5,372**	**3,889**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significant.

Table T: Evaluation Rating NCTQ *Standards* Models (Reflecting on Practice)

Standard	Case-Wise Deletion		Multiple Imputation		Dummy Variable With Zero Replacement	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Selection Criteria	**1.074**** (0.007)	**1.078**** (0.002)	**1.074**** (0.007)	**1.077**** (0.002)	**1.074**** (0.007)	**1.077**** (0.002)
Cases	**3,887**	**5,368**	**3,890**	**5,372**	**3,890**	**5,372**
Early Reading	0.999 (0.980)	0.976 (0.355)	0.999 (0.977)	0.980 (0.403)	0.999 (0.997)	0.977 (0.375)
Cases	**2,378**	**3,239**	**2,572**	**3,498**	**2,572**	**3,498**
English Language Learners	**1.079**** (0.009)	**1.075**** (0.007)	**1.054**$^{+}$ (0.078)	**1.051**$^{+}$ (0.067)	**1.080*** (0.010)	**1.075**** (0.009)
Cases	**2,174**	**2,974**	**2,572**	**3,498**	**2,572**	**3,498**
Struggling Readers	0.961 (0.248)	**0.946**$^{+}$ (0.073)	0.960 (0.221)	**0.949**$^{+}$ (0.081)	0.962 (0.275)	**0.946**$^{+}$ (0.077)
Cases	**2,178**	**2,980**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Math	0.959 (0.344)	0.974 (0.512)	0.973 (0.523)	0.984 (0.685)	0.957 (0.330)	0.972 (0.489)
Cases	**2,362**	**3,224**	**2,572**	**3,498**	**2,572**	**3,498**
Elementary Content	**1.176**** (0.004)	**1.162**** (0.004)	**1.176**** (0.004)	**1.162**** (0.004)	**1.176**** (0.004)	**1.162**** (0.004)
Cases	**2,572**	**3,498**	**2,572**	**3,498**	**2,572**	**3,498**
Middle School Content	0.944 (0.384)	0.962 (0.510)	0.951 (0.435)	0.955 (0.403)	0.939 (0.340)	0.958 (0.454)
Cases	**434**	**629**	**482**	**701**	**482**	**701**
High School Content	0.945 (0.457)	0.989 (0.874)	0.942 (0.430)	0.987 (0.845)	0.944 (0.456)	0.989 (0.873)
Cases	**832**	**1,169**	**836**	**1,173**	**836**	**1,173**
Management	0.951 (0.231)	**0.928**$^{+}$ (0.053)	**0.875**** (0.000)	**0.876**** (0.000)	0.952 (0.241)	**0.929**$^{+}$ (0.054)
Cases	**3,047**	**4,193**	**3,890**	**5,372**	**3,890**	**5,372**
Planning	1.005 (0.908)	1.061 (0.165)	0.948 (0.113)	0.972 (0.368)	0.977 (0.595)	1.029 (0.464)
Cases	**1,754**	**2,400**	**3,890**	**5,372**	**3,890**	**5,372**
Assessment	**0.888*** (0.022)	**0.856**** (0.001)	0.954 (0.343)	0.940 (0.167)	**0.889*** (0.024)	**0.857**** (0.001)
Cases	**2,757**	**3,804**	**3,890**	**5,372**	**3,890**	**5,372**
Student Teaching	0.983 (0.631)	0.975 (0.448)	0.987 (0.703)	0.977 (0.469)	0.982 (0.619)	0.974 (0.432)
Cases	**3,646**	**5,045**	**3,890**	**5,372**	**3,890**	**5,372**
Secondary Methods	**1.137**$^{+}$ (0.062)	**1.133*** (0.036)	**1.122**$^{+}$ (0.054)	**1.128*** (0.024)	**1.158*** (0.029)	**1.145*** (0.022)
Cases	**1,109**	**1,571**	**1,318**	**1,874**	**1,318**	**1,874**
Outcomes	1.021 (0.419)	1.003 (0.894)	1.013 (0.612)	0.999 (0.973)	1.022 (0.380)	1.004 (0.865)
Cases	**3,331**	**4,607**	**3,890**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells display odds ratios with p-values in parentheses.*

Note: Yellow cells mean the 'missingness' variable was negative and significant; green cells mean the 'missingness' variable was positive and significan

NCTQ INDICATOR MODELS

Undergraduate Selection Criteria Indicators

Table 1: Elementary Grades Value-Added

	Elementary Mathematics				Elementary Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Minimum GPA	**0.035**+ (0.019)	0.017 (0.018)	**0.034**+ (0.019)	0.016 (0.018)	0.001 (0.015)	0.001 (0.013)	0.001 (0.015)	0.000 (0.013)
Minimum GPA Higher Than 3.0	-0.069 (0.077)	-0.053 (0.091)	-0.066 (0.077)	-0.051 (0.090)	-0.024 (0.030)	-0.008 (0.031)	-0.023 (0.030)	-0.007 (0.030)
Average SAT above 1120	0.022 (0.022)	0.020 (0.021)	0.023 (0.023)	0.021 (0.021)	0.016 (0.015)	0.006 (0.013)	0.015 (0.014)	0.006 (0.013)
Cases	**21,958**	**28,946**	**22,061**	**29,069**	**24,392**	**32,022**	**24,436**	**32,086**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 2: Middle Grades Value-Added

	Middle Grades Mathematics				Middle Grades Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Minimum GPA	0.068 (0.057)	**0.064*** (0.031)	0.066 (0.056)	**0.064*** (0.030)	0.004 (0.021)	-0.002 (0.022)	0.004 (0.021)	-0.002 (0.022)
Minimum GPA Higher Than 3.0	**-0.153**+ (0.082)	-0.083 (0.084)	**-0.154**+ (0.084)	-0.077 (0.087)	-0.025 (0.036)	-0.039 (0.039)	-0.025 (-0.025)	-0.037 (0.036)
Average SAT above 1120	-0.017 (0.028)	-0.014 (0.027)	-0.016 (0.028)	-0.013 (0.027)	**0.040*** (0.018)	-0.001 (0.016)	**0.040*** (0.018)	-0.001 (0.016)
Cases	**16,657**	**23,323**	**16,657**	**23,323**	**15,101**	**20,070**	**15,101**	**20,070**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Undergraduate Selection Criteria Indicators

Table 3: Algebra I EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Minimum GPA	0.032 (0.026)	0.036 (0.027)	0.032 (0.026)	0.036 (0.027)
Minimum GPA Higher Than 3.0	**-0.134*** (0.055)	**-0.124*** (0.047)	**-0.134*** (0.055)	**-0.124*** (0.047)
Average SAT above 1120	0.047 (0.046)	0.055 (0.037)	0.047 (0.046)	0.055 (0.037)
Cases	**7,029**	**9,769**	**7,029**	**9,769**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 4: Biology EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Minimum GPA	**-1.092**** (0.352)	**-0.708*** (0.266)	**-1.092**** (0.352)	**-0.708*** (0.266)
Minimum GPA Higher Than 3.0	**0.364*** (0.171)	**0.267*** (0.127)	**0.364*** (0.171)	**0.267*** (0.127)
Average SAT above 1120	-0.110 (0.100)	0.043 (0.070)	-0.110 (0.100)	0.043 (0.070)
Cases	**2,322**	**4,148**	**2,322**	**4,148**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 5: English I/II EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Minimum GPA	**-0.434**** (0.169)	**-0.482**** (0.165)	**-0.434**** (0.169)	**-0.482**** (0.165)
Minimum GPA Higher Than 3.0	---	---	---	---
Average SAT above 1120	-0.025 (0.035)	-0.054 (0.033)	-0.025 (0.035)	-0.054 (0.033)
Cases	**4,348**	**5,884**	**4,348**	**5,884**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Undergraduate Selection Criteria Indicators

Table 6: Evaluation Ratings with Case-Wise Deletion

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Minimum GPA	1.117 (0.213)	1.101 (0.243)	0.977 (0.842)	0.984 (0.873)	**0.838**$^{+}$ (0.093)	0.926 (0.418)	1.104 (0.285)	1.105 (0.301)	1.033 (0.750)	1.051 (0.559)
Minimum GPA Higher Than 3.0	0.762 (0.254)	0.719 (0.146)	0.776 (0.298)	0.863 (0.514)	0.986 (0.955)	0.933 (0.758)	0.834 (0.393)	0.821 (0.340)	0.846 (0.415)	0.766 (0.179)
Average SAT above 1120	**1.212*** (0.028)	**1.194*** (0.022)	1.079 (0.342)	1.094 (0.213)	**1.217*** (0.026)	**1.232**** (0.008)	**1.204*** (0.023)	**1.186*** (0.021)	**1.250**** (0.008)	**1.217*** (0.010)
Cases	**3,403**	**4,634**	**3,403**	**4,633**	**3,403**	**4,633**	**3,402**	**4,633**	**3,403**	**4,633**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Table 7: Evaluation Ratings with Multiple Imputation

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Minimum GPA	1.116 (0.213)	1.101 (0.238)	0.973 (0.818)	0.982 (0.857)	**0.838**$^{+}$ (0.092)	0.926 (0.417)	1.099 (0.310)	1.102 (0.312)	1.032 (0.751)	1.051 (0.557)
Minimum GPA Higher Than 3.0	0.762 (0.254)	0.719 (0.146)	0.778 (0.302)	0.865 (0.519)	0.986 (0.955)	0.934 (0.762)	0.835 (0.396)	0.821 (0.341)	0.847 (0.415)	0.767 (0.181)
Average SAT above 1120	**1.213*** (0.027)	**1.195*** (0.021)	1.077 (0.358)	1.095 (0.210)	**1.217*** (0.026)	**1.235**** (0.007)	**1.198*** (0.027)	**1.181*** (0.024)	**1.251**** (0.008)	**1.220**** (0.009)
Cases	**3,406**	**4,638**	**3,406**	**4,637**	**3,406**	**4,637**	**3,405**	**4,637**	**3,406**	**4,637**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Elementary Mathematics Indicators

Table 8: Elementary Grades Value-Added

	Elementary Mathematics				Elementary Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Total Credit Equivalent	-0.006 (0.009)	-0.004 (0.008)	-0.004 (0.008)	-0.002 (0.007)	-0.007 (0.005)	-0.003 (0.004)	-0.006 (0.005)	-0.003 (0.004)
Instructional Score	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
School Sufficiently Selective	0.008 (0.024)	0.006 (0.022)	0.005 (0.023)	0.006 (0.021)	0.002 (0.015)	-0.009 (0.013)	0.002 (0.014)	-0.007 (0.013)
Math Methods Credits	0.007 (0.008)	0.009 (0.007)	0.009 (0.008)	0.010 (0.007)	**0.010*** (0.005)	**0.010*** (0.004)	**0.009**$^{+}$ (0.005)	**0.009*** (0.004)
Cases	**21,431**	**28,783**	**24,235**	**32,293**	**23,913**	**32,195**	**26,858**	**35,749**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 9: Evaluation Ratings with Case-Wise Deletion

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Total Credit Equivalent	0.957 (0.253)	0.967 (0.365)	0.962 (0.312)	0.982 (0.591)	0.958 (0.285)	0.955 (0.212)	0.971 (0.486)	0.989 (0.774)	**0.924*** (0.044)	**0.934**$^{+}$ (0.052)
Instructional Score	1.000 (0.880)	1.000 (0.995)	0.999 (0.701)	0.998 (0.461)	1.000 (0.830)	1.001 (0.511)	0.999 (0.911)	0.999 (0.869)	1.003 (0.185)	1.003 (0.140)
School Sufficiently Selective	**1.301*** (0.019)	**1.285*** (0.011)	1.022 (0.831)	1.035 (0.713)	**1.226**$^{+}$ (0.079)	**1.237*** (0.039)	**1.282*** (0.021)	**1.260*** (0.015)	**1.296*** (0.015)	**1.341**** (0.003)
Math Methods Credits	0.983 (0.713)	0.984 (0.675)	0.960 (0.303)	0.955 (0.192)	1.011 (0.785)	1.010 (0.793)	0.974 (0.527)	0.978 (0.541)	0.968 (0.446)	0.990 (0.801)
Cases	**2,306**	**3,144**	**2,306**	**3,143**	**2,306**	**3,143**	**2,306**	**3,144**	**2,306**	**3,143**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Elementary Mathematics Indicators

Table 10: Evaluation Ratings with Multiple Imputation

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Total Credit Equivalent	0.974 (0.479)	0.984 (0.654)	0.984 (0.659)	1.003 (0.937)	0.972 (0.443)	0.971 (0.394)	0.989 (0.774)	1.002 (0.957)	0.946 (0.150)	0.954 (0.181)
Instructional Score	0.999 (0.920)	0.999 (0.812)	0.998 (0.464)	0.998 (0.290)	0.999 (0.961)	1.000 (0.772)	0.999 (0.697)	0.999 (0.710)	1.002 (0.347)	1.002 (0.305)
School Sufficiently Selective	**1.301*** (0.017)	**1.267*** (0.016)	1.028 (0.779)	1.042 (0.649)	1.193 (0.114)	**1.197+** (0.074)	**1.275*** (0.020)	**1.241*** (0.021)	**1.276*** (0.023)	**1.335**** (0.003)
Math Methods Credits	0.982 (0.661)	0.982 (0.616)	0.966 (0.325)	0.961 (0.216)	1.011 (0.774)	1.010 (0.790)	0.973 (0.466)	0.976 (0.469)	0.958 (0.286)	0.979 (0.554)
Cases	**2,572**	**3,499**	**2,572**	**3,498**	**2,572**	**3,498**	**2,572**	**3,499**	**2,572**	**3,498**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Classroom Management Indicators

Table 11: Elementary Grades Value-Added

TPP Assess Whether the Student Teacher is...	Elementary Mathematics				Elementary Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	-0.058 (0.048)	-0.049 (0.040)	-0.007 (0.039)	-0.009 (0.035)	0.004 (0.028)	0.020 (0.023)	0.010 (0.026)	0.015 (0.021)
Able to manage time	0.072 (0.057)	0.024 (0.050)	0.024 (0.050)	0.000 (0.046)	0.053 (0.037)	0.007 (0.031)	0.026 (0.033)	0.002 (0.028)
Able to manage materials	-0.028 (0.037)	-0.001 (0.032)	-0.009 (0.032)	0.008 (0.030)	-0.023 (0.025)	-0.016 (0.020)	-0.007 (0.022)	-0.008 (0.018)
Able to maintain engagement	**-0.101*** (0.045)	-0.052 (0.039)	-0.058 (0.039)	-0.029 (0.035)	-0.043 (0.028)	-0.010 (0.025)	-0.028 (0.026)	-0.011 (0.023)
Able to manage the physical environment	0.001 (0.037)	0.003 (0.033)	-0.009 (0.030)	-0.004 (0.028)	0.007 (0.020)	0.028 (0.017)	0.001 (0.018)	0.015 (0.016)
Able to use praise	-0.012 (0.045)	0.025 (0.038)	-0.005 (0.036)	0.018 (0.033)	**-0.063*** (0.026)	-0.034 (0.022)	-0.035 (0.023)	-0.020 (0.018)
Able to manage minor student misbehavior	**0.085**$^{+}$ (0.049)	0.071 (0.044)	0.035 (0.040)	0.033 (0.037)	0.012 (0.027)	-0.018 (0.024)	0.002 (0.025)	-0.010 (0.021)
Aware of minor student misbehavior	0.035 (0.036)	0.028 (0.033)	0.030 (0.030)	0.023 (0.029)	-0.010 (0.022)	-0.017 (0.020)	-0.004 (0.020)	-0.009 (0.017)
Able to manage significant student misbehavior	-0.041 (0.037)	-0.042 (0.033)	-0.003 (0.027)	-0.008 (0.025)	0.025 (0.021)	0.024 (0.017)	0.026 (0.018)	0.023 (0.015)
Cases	**18,147**	**24,385**	**24,295**	**32,376**	**21,113**	**28,446**	**26,935**	**35,991**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Classroom Management Indicators

Table 12: Middle Grades Value-Added

TPP Assess Whether the Student Teacher is...	Middle Grades Mathematics				Middle Grades Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	**0.104**$^{+}$ (0.055)	0.042 (0.048)	0.087 (0.062)	0.044 (0.052)	**-0.059*** (0.023)	**-0.050*** (0.021)	-0.041 (0.029)	-0.030 (0.031)
Able to manage time	0.004 (0.063)	0.015 (0.054)	-0.002 (0.063)	0.010 (0.054)	**0.078*** (0.030)	**0.070*** (0.027)	**0.061**$^{+}$ (0.034)	0.046 (0.033)
Able to manage materials	-0.035 (0.057)	-0.034 (0.047)	-0.027 (0.056)	-0.022 (0.047)	**-0.082**** (0.026)	**-0.091**** (0.023)	**-0.061*** (0.028)	**-0.056**$^{+}$ (0.029)
Able to maintain engagement	0.001 (0.052)	-0.038 (0.046)	-0.005 (0.054)	-0.034 (0.046)	0.018 (0.024)	0.029 (0.018)	0.011 (0.025)	0.022 (0.023)
Able to manage the physical environment	-0.008 (0.050)	0.018 (0.045)	-0.019 (0.054)	0.001 (0.047)	0.003 (0.023)	**0.036*** (0.018)	-0.007 (0.028)	0.024 (0.026)
Able to use praise	0.007 (0.057)	-0.005 (0.053)	0.012 (0.059)	0.000 (0.053)	0.039 (0.027)	0.033 (0.024)	0.024 (0.030)	0.027 (0.028)
Able to manage minor student misbehavior	0.010 (0.063)	0.019 (0.054)	0.023 (0.064)	0.018 (0.053)	0.036 (0.031)	0.042 (0.024)	0.027 (0.033)	0.024 (0.031)
Aware of minor student misbehavior	-0.037 (0.042)	0.000 (0.038)	-0.025 (0.042)	0.012 (0.037)	-0.037 (0.027)	**-0.045*** (0.022)	-0.023 (0.027)	-0.025 (0.027)
Able to manage significant student misbehavior	-0.010 (0.042)	-0.025 (0.037)	-0.001 (0.043)	-0.007 (0.035)	-0.008 (0.027)	-0.013 (0.026)	0.016 (0.026)	-0.002 (0.025)
Cases	**14,518**	**19,942**	**18,195**	**25,640**	**14,464**	**19,872**	**18,780**	**25,602**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Classroom Management Indicators

Table 13: Algebra I EOC Value-Added

TPP Assess Whether the Student Teacher is...	Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	-0.119 (0.081)	**-0.154**** (0.050)	-0.027 (0.080)	-0.065 (0.068)
Able to manage time	0.039 (0.076)	0.064 (0.059)	0.007 (0.099)	0.006 (0.088)
Able to manage materials	**-0.125**$^{+}$ (0.065)	**-0.196**** (0.053)	-0.106 (0.077)	**-0.129**$^{+}$ (0.067)
Able to maintain engagement	-0.008 (0.066)	0.036 (0.052)	0.001 (0.065)	0.006 (0.059)
Able to manage the physical environment	0.124 (0.109)	**0.137*** (0.062)	0.028 (0.090)	0.041 (0.075)
Able to use praise	-0.016 (0.077)	0.040 (0.069)	-0.025 (0.074)	0.006 (0.069)
Able to manage minor student misbehavior	0.141 (0.092)	0.087 (0.072)	0.131 (0.093)	0.097 (0.083)
Aware of minor student misbehavior	**0.189**** (0.068)	**0.129*** (0.055)	0.053 (0.061)	0.060 (0.052)
Able to manage significant student misbehavior	0.106 (0.073)	**0.100**$^{+}$ (0.056)	0.048 (0.057)	0.048 (0.047)
Cases	**5,440**	**7,916**	**8,483**	**12,155**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Classroom Management Indicators

Table 14: Biology EOC Value-Added

TPP Assess Whether the Student Teacher is...	Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	-0.018 (0.090)	0.156 (0.128)	0.001 (0.130)	0.095 (0.129)
Able to manage time	**-0.359*** (0.102)	**-0.518**** (0.109)	-0.171 (0.152)	**-0.258**$^{+}$ (0.145)
Able to manage materials	0.056 (0.063)	**0.118**$^{+}$ (0.068)	0.069 (0.097)	0.064 (0.094)
Able to maintain engagement	**0.231**** (0.072)	**0.255**** (0.062)	0.015 (0.112)	-0.012 (0.104)
Able to manage the physical environment	0.107 (0.100)	-0.134 (0.137)	0.112 (0.121)	-0.001 (0.109)
Able to use praise	**0.399**** (0.092)	**0.351**** (0.093)	0.115 (0.126)	0.077 (0.115)
Able to manage minor student misbehavior	0.158 (0.114)	**0.171*** (0.075)	0.077 (0.172)	0.113 (0.143)
Aware of minor student misbehavior	0.084 (0.075)	0.013 (0.097)	0.042 (0.087)	0.026 (0.083)
Able to manage significant student misbehavior	-0.053 (0.061)	-0.052 (0.064)	-0.076 (0.066)	-0.053 (0.078)
Cases	**3,501**	**5,205**	**4,846**	**7,405**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Classroom Management Indicators

Table 15: English I/II EOC Value-Added

TPP Assess Whether the Student Teacher is...	Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	0.018 (0.075)	0.005 (0.082)	-0.015 (0.075)	-0.033 (0.065)
Able to manage time	-0.103 (0.097)	-0.066 (0.106)	-0.027 (0.099)	-0.013 (0.082)
Able to manage materials	0.040 (0.058)	0.018 (0.056)	0.005 (0.059)	-0.011 (0.046)
Able to maintain engagement	**0.144**** (0.041)	**0.081**$^{+}$ (0.045)	**0.098**$^{+}$ (0.050)	0.061 (0.052)
Able to manage the physical environment	-0.099 (0.060)	-0.105 (0.072)	-0.049 (0.067)	-0.018 (0.061)
Able to use praise	0.028 (0.045)	-0.044 (0.045)	-0.015 (0.061)	-0.027 (0.050)
Able to manage minor student misbehavior	0.005 (0.056)	0.056 (0.052)	0.021 (0.059)	0.042 (0.051)
Aware of minor student misbehavior	0.007 (0.039)	-0.035 (0.047)	-0.001 (0.040)	-0.001 (0.040)
Able to manage significant student misbehavior	-0.062 (0.050)	**-0.093**$^{+}$ (0.048)	-0.063 (0.044)	-0.062 (0.043)
Cases	**5,218**	**7,339**	**6,546**	**9,228**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Classroom Management Indicators

Table 16: Evaluation Ratings with Case-Wise Deletion

TPP Assess Whether the Student Teacher is…	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	**0.716**$^{+}$ (0.054)	0.806 (0.185)	0.789 (0.159)	0.885 (0.423)	0.820 (0.260)	**0.758**$^{+}$ (0.080)	0.891 (0.490)	0.928 (0.628)	**0.594**** (0.003)	**0.642**** (0.006)
Able to manage time	0.935 (0.747)	0.983 (0.929)	1.026 (0.900)	0.926 (0.688)	1.094 (0.685)	1.111 (0.589)	0.826 (0.382)	0.817 (0.305)	1.128 (0.555)	1.192 (0.354)
Able to manage materials	**0.749*** (0.032)	**0.810**$^{+}$ (0.087)	**0.782**$^{+}$ (0.057)	0.858 (0.202)	0.809 (0.162)	0.809 (0.114)	0.881 (0.372)	0.905 (0.440)	**0.718*** (0.025)	**0.713*** (0.013)
Able to maintain engagement	1.017 (0.917)	1.072 (0.651)	0.777 (0.135)	0.895 (0.472)	0.856 (0.350)	0.913 (0.544)	0.805 (0.188)	0.967 (0.833)	**0.751**$^{+}$ (0.073)	0.855 (0.312)
Able to manage the physical environment	1.082 (0.547)	1.033 (0.795)	0.917 (0.513)	0.892 (0.357)	0.932 (0.609)	0.953 (0.719)	0.831 (0.165)	0.878 (0.308)	0.912 (0.506)	0.894 (0.400)
Able to use praise	1.241 (0.183)	1.114 (0.470)	0.849 (0.282)	0.899 (0.455)	0.832 (0.282)	0.909 (0.536)	0.948 (0.750)	1.008 (0.957)	0.932 (0.686)	0.793 (0.162)
Able to manage minor student misbehavior	**1.401**$^{+}$ (0.052)	**1.342**$^{+}$ (0.069)	**1.690**** (0.002)	**1.552**** (0.004)	1.251 (0.202)	**1.351**$^{+}$ (0.065)	**1.469*** (0.019)	**1.357**$^{+}$ (0.052)	**1.814**** (0.000)	**1.702**** (0.001)
Aware of minor student misbehavior	1.023 (0.862)	0.877 (0.293)	1.000 (1.000)	0.931 (0.544)	0.934 (0.623)	0.959 (0.746)	1.032 (0.810)	0.954 (0.702)	1.112 (0.435)	0.991 (0.946)
Able to manage significant student misbehavior	1.001 (0.994)	0.889 (0.297)	0.959 (0.737)	0.902 (0.335)	1.003 (0.983)	0.925 (0.497)	0.948 (0.669)	0.877 (0.248)	0.954 (0.703)	0.922 (0.473)
Cases	**3,047**	**4,194**	**3,047**	**4,193**	**3,047**	**4,193**	**3,046**	**4,193**	**3,047**	**4,193**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Classroom Management Indicators

Table 17: Evaluation Ratings with Multiple Imputation

TPP Assess Whether the Student Teacher Is…	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Able to establish expectations for behavior	0.856 (0.420)	0.922 (0.650)	0.916 (0.593)	0.985 (0.920)	0.895 (0.555)	0.865 (0.416)	0.992 (0.962)	1.013 (0.938)	0.778 (0.180)	0.806 (0.209)
Able to manage time	0.939 (0.767)	0.977 (0.907)	0.954 (0.813)	0.915 (0.621)	1.076 (0.744)	1.092 (0.672)	0.880 (0.552)	0.898 (0.595)	0.996 (0.986)	1.029 (0.888)
Able to manage materials	**0.735*** (0.039)	**0.794**$^{+}$ (0.081)	**0.792**$^{+}$ (0.076)	0.825 (0.113)	**0.768**$^{+}$ (0.087)	**0.764**$^{+}$ (0.059)	0.793 (0.109)	0.802 (0.105)	**0.734*** (0.043)	**0.757*** (0.049)
Able to maintain engagement	1.032 (0.853)	1.070 (0.663)	0.877 (0.414)	0.946 (0.702)	0.937 (0.712)	0.964 (0.823)	0.896 (0.517)	0.994 (0.968)	0.889 (0.493)	0.971 (0.854)
Able to manage the physical environment	0.960 (0.773)	0.946 (0.658)	0.913 (0.475)	0.894 (0.351)	0.899 (0.438)	0.915 (0.492)	0.837 (0.221)	0.866 (0.283)	0.894 (0.418)	0.892 (0.383)
Able to use praise	1.033 (0.840)	0.982 (0.901)	0.831 (0.193)	0.839 (0.178)	0.820 (0.240)	0.846 (0.284)	0.879 (0.413)	0.886 (0.417)	0.891 (0.478)	0.808 (0.159)
Able to manage minor student misbehavior	1.298 (0.176)	1.276 (0.153)	**1.427*** (0.029)	**1.367*** (0.039)	1.181 (0.385)	1.255 (0.216)	1.313 (0.121)	1.268 (0.157)	**1.422**$^{+}$ (0.060)	**1.368**$^{+}$ (0.056)
Aware of minor student misbehavior	0.865 (0.280)	**0.805**$^{+}$ (0.094)	0.866 (0.232)	0.832 (0.111)	0.804 (0.110)	0.831 (0.168)	0.885 (0.353)	0.843 (0.179)	0.893 (0.418)	0.875 (0.327)
Able to manage significant student misbehavior	0.955 (0.719)	0.896 (0.330)	0.936 (0.566)	0.899 (0.292)	0.966 (0.790)	0.923 (0.499)	0.955 (0.703)	0.898 (0.322)	0.896 (0.382)	0.889 (0.299)
Cases	**3,890**	**5,373**	**3,890**	**5,372**	**3,890**	**5,372**	**3,889**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Student Teaching Indicators

Table 18: Elementary Grades Value-Added

	Elementary Mathematics				Elementary Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Four Required Observations	0.026 (0.036)	0.015 (0.030)	0.024 (0.033)	0.019 (0.029)	**0.047**+ (0.024)	0.023 (0.021)	**0.041**+ (0.022)	0.025 (0.019)
Five or More Required Observations	0.014 (0.034)	0.034 (0.030)	0.006 (0.032)	0.026 (0.029)	0.021 (0.021)	0.016 (0.019)	0.015 (0.021)	0.014 (0.018)
Observations at Regular Intervals	-0.015 (0.028)	0.003 (0.024)	-0.018 (0.025)	-0.010 (0.022)	-0.010 (0.019)	0.006 (0.017)	-0.010 (0.017)	-0.001 (0.015)
Requires Capable Mentor	-0.004 (0.027)	0.018 (0.024)	-0.001 (0.025)	0.015 (0.023)	0.023 (0.017)	0.021 (0.015)	0.023 (0.016)	0.018 (0.014)
Requires Proven Effective Instructors	0.081 (0.056)	0.040 (0.053)	0.022 (0.066)	0.004 (0.063)	-0.007 (0.040)	0.005 (0.033)	-0.018 (0.046)	-0.003 (0.036)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	-0.057 (0.079)	-0.048 (0.069)	-0.022 (0.091)	-0.014 (0.083)	-0.017 (0.053)	-0.046 (0.047)	-0.018 (0.057)	-0.040 (0.048)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	0.060 (0.055)	0.043 (0.049)	0.061 (0.051)	0.055 (0.047)	0.033 (0.037)	0.009 (0.031)	0.028 (0.034)	0.015 (0.029)
TPP Gathers Any Substantive Data	0.050 (0.069)	0.040 (0.061)	0.044 (0.063)	0.038 (0.060)	0.028 (0.039)	0.019 (0.035)	0.026 (0.039)	0.018 (0.035)
Cases	**20,533**	**27,709**	**24,295**	**32,376**	**22,831**	**31,106**	**26,935**	**35,991**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: The reference category is three or fewer required observations.

Student Teaching Indicators

Table 19: Middle Grades Value-Added

	Middle Grades Mathematics				Middle Grades Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Four Required Observations	-0.029 (0.039)	-0.008 (0.033)	-0.005 (0.042)	0.004 (0.033)	0.020 (0.025)	0.029 (0.023)	0.013 (0.025)	0.016 (0.025)
Five or More Required Observations	-0.004 (0.0420	-0.003 (0.033)	0.015 (0.046)	0.008 (0.033)	0.013 (0.028)	-0.005 (0.022)	0.003 (0.027)	-0.019 (0.025)
Observations at Regular Intervals	**0.089**** (0.027)	**0.061*** (0.025)	**0.074*** (0.029)	**0.051**$^{+}$ (0.026)	0.003 (0.016)	0.004 (0.016)	-0.002 (0.016)	0.003 (0.015)
Requires Capable Mentor	-0.018 (0.030)	-0.024 (0.026)	-0.022 (0.031)	-0.027 (0.027)	**0.031**$^{+}$ (0.018)	**0.037*** (0.016)	**0.034**$^{+}$ (0.018)	**0.038*** (0.017)
Requires Proven Effective Instructors	0.104 (0.091)	**0.136**$^{+}$ (0.080)	0.107 (0.097)	**0.135**$^{+}$ (0.081)	-0.023 (0.035)	-0.001 (0.025)	-0.035 (0.040)	-0.022 (0.040)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	-0.044 (0.079)	-0.036 (0.073)	-0.023 (0.087)	-0.022 (0.081)	**-0.136**** (0.030)	**-0.167**** (0.024)	**-0.124**** (0.039)	**-0.144**** (0.042)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	0.032 (0.063)	0.051 (0.054)	0.060 (0.065)	0.062 (0.056)	0.044 (0.040)	**0.046*** (0.023)	0.037 (0.039)	0.030 (0.028)
TPP Gathers Any Substantive Data	-0.042 (0.040)	-0.056 (0.044)	-0.049 (0.059)	-0.058 (0.057)	0.032 (0.035)	0.030 (0.031)	0.033 (0.035)	0.029 (0.035)
Cases	**17,316**	**24,333**	**18,195**	**25,640**	**17,776**	**24,353**	**18,780**	**25,602**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: The reference category is three or fewer required observations.

Student Teaching Indicators

Table 20: Algebra I EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Four Required Observations	0.040 (0.074)	0.047 (0.063)	0.050 (0.065)	0.020 (0.054)
Five or More Required Observations	-0.043 (0.084)	0.006 (0.064)	-0.022 (0.078)	-0.019 (0.057)
Observations at Regular Intervals	-0.033 (0.044)	-0.041 (0.040)	-0.034 (0.045)	-0.044 (0.040)
Requires Capable Mentor	-0.008 (0.047)	-0.040 (0.046)	-0.012 (0.049)	-0.036 (0.045)
Requires Proven Effective Instructors	**-0.624**** (0.086)	0.120 (0.098)	0.016 (0.034)	0.106 (0.118)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	---	---	-0.048 (0.910)	0.011 (0.775)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	-0.060 (0.086)	0.028 (0.073)	-0.009 (0.099)	0.030 (0.084)
TPP Gathers Any Substantive Data	-0.047 (0.073)	-0.043 (0.071)	-0.037 (0.074)	-0.019 (0.066)
Cases	**7,512**	**10,599**	**8,483**	**12,155**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: The reference category is three or fewer required observations.

Student Teaching Indicators

Table 21: Biology EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Four Required Observations	**-0.157*** (0.075)	**-0.194*** (0.084)	-0.072 (0.078)	-0.086 (0.086)
Five or More Required Observations	**-0.168*** (0.080)	**-0.188*** (0.071)	-0.112 (0.078)	-0.111 (0.077)
Observations at Regular Intervals	0.060 (0.074)	-0.001 (0.083)	0.088 (0.082)	0.033 (0.090)
Requires Capable Mentor	-0.011 (0.090)	-0.113 (0.086)	0.004 (0.099)	-0.093 (0.097)
Requires Proven Effective Instructors	---	---	-0.028 (1.908)	0.275 (1.262)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	0.095 (0.101)	0.152 (0.098)	0.059 (0.112)	0.086 (0.115)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	-0.151 (0.135)	-0.054 (0.108)	-0.147 (0.148)	-0.012 (0.133)
TPP Gathers Any Substantive Data	-0.155 (0.105)	-0.079 (0.115)	-0.209 (0.127)	-0.097 (0.176)
Cases	**4,507**	**6,905**	**4,846**	**7,405**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: The reference category is three or fewer required observations.

Student Teaching Indicators

Table 22: English I/II EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Four Required Observations	-0.024 (0.062)	-0.004 (0.062)	-0.009 (0.055)	0.007 (0.049)
Five or More Required Observations	-0.030 (0.051)	-0.034 (0.046)	-0.023 (0.048)	-0.021 (0.043)
Observations at Regular Intervals	**-0.079*** (0.035)	-0.041 (0.036)	**-0.071**$^{+}$ (0.036)	-0.033 (0.035)
Requires Capable Mentor	-0.028 (0.050)	0.006 (0.045)	-0.017 (0.047)	0.005 (0.042)
Requires Proven Effective Instructors	**0.688**** (0.243)	**0.318**** (0.074)	0.450 (0.289)	**0.244*** (0.092)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	---	-0.080 (0.049)	-0.331 (1.398)	**-0.094**$^{+}$ (0.053)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	-0.087 (0.057)	-0.115 (0.071)	-0.093 (0.057)	-0.109 (0.069)
TPP Gathers Any Substantive Data	-0.020 (0.035)	-0.014 (0.042)	-0.025 (0.037)	-0.021 (0.041)
Cases	**6,170**	**8,812**	**6,546**	**9,228**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*
Note: The reference category is three or fewer required observations.

Student Teaching Indicators

Table 23: Evaluation Ratings with Case-Wise Deletion

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Four Required Observations	0.912 (0.510)	0.958 (0.727)	1.080 (0.535)	1.055 (0.632)	**1.258**$^{+}$ (0.098)	1.224 (0.103)	1.021 (0.874)	1.073 (0.556)	1.210 (0.163)	1.145 (0.269)
Five or More Required Observations	0.820 (0.160)	0.869 (0.264)	0.996 (0.980)	0.921 (0.479)	1.112 (0.461)	1.072 (0.587)	0.985 (0.918)	0.987 (0.916)	0.999 (1.000)	0.993 (0.961)
Observations at Regular Intervals	**0.762**** (0.003)	**0.778**** (0.002)	0.876 (0.124)	**0.861**$^{+}$ (0.051)	**0.672**** (0.000)	**0.680**** (0.000)	**0.738**** (0.001)	**0.745**** (0.000)	**0.686**** (0.000)	**0.693**** (0.000)
Requires Capable Mentor	**0.802*** (0.029)	0.870 (0.117)	**0.828*** (0.041)	**0.833*** (0.027)	**0.793*** (0.021)	**0.816*** (0.025)	**0.714**** (0.000)	**0.756**** (0.001)	**0.764**** (0.004)	**0.839*** (0.045)
Requires Proven Effective Instructors	0.920 (0.740)	0.742 (0.181)	0.832 (0.491)	0.682 (0.123)	0.707 (0.110)	0.733 (0.163)	0.893 (0.638)	0.787 (0.277)	1.101 (0.669)	1.096 (0.678)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	1.288 (0.298)	**1.543**$^{+}$ (0.080)	1.142 (0.660)	1.438 (0.230)	1.356 (0.223)	1.304 (0.404)	1.060 (0.822)	1.065 (0.839)	1.182 (0.549)	0.974 (0.926)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	1.213 (0.378)	1.120 (0.554)	1.244 (0.240)	1.103 (0.571)	**1.519**$^{+}$ (0.055)	**1.388**$^{+}$ (0.095)	**1.529*** (0.040)	**1.384**$^{+}$ (0.080)	**1.463**$^{+}$ (0.073)	1.165 (0.428)
TPP Gathers Any Substantive Data	0.987 (0.960)	1.058 (0.801)	1.386 (0.150)	**1.408**$^{+}$ (0.086)	**1.422**$^{+}$ (0.099)	**1.453**$^{+}$ (0.066)	1.204 (0.413)	1.175 (0.455)	1.414 (0.125)	**1.438**$^{+}$ (0.067)
Cases	**3,437**	**4,803**	**3,437**	**4,802**	**3,437**	**4,803**	**3,436**	**4,802**	**3,437**	**4,802**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses. The reference category is three or fewer required observations.*

Student Teaching Indicators

Table 24: Evaluation Ratings with Multiple Imputation

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Four Required Observations	0.946 (0.677)	0.986 (0.905)	1.072 (0.548)	1.054 (0.620)	**1.312*** (0.040)	**1.240**+ (0.072)	1.037 (0.779)	1.079 (0.508)	1.137 (0.323)	1.070 (0.563)
Five or More Required Observations	0.851 (0.222)	0.909 (0.416)	1.014 (0.905)	0.955 (0.663)	1.177 (0.228)	1.113 (0.376)	1.026 (0.840)	1.027 (0.816)	0.978 (0.866)	0.965 (0.763)
Observations at Regular Intervals	**0.789**** (0.007)	**0.816**** (0.009)	0.911 (0.255)	0.904 (0.167)	**0.706**** (0.000)	**0.725**** (0.000)	**0.784**** (0.004)	**0.800**** (0.003)	**0.743**** (0.001)	**0.751**** (0.000)
Requires Capable Mentor	**0.849**+ (0.093)	0.918 (0.317)	**0.859**+ (0.091)	**0.864**+ (0.070)	**0.830**+ (0.055)	**0.860**+ (0.085)	**0.747**** (0.002)	**0.796**** (0.006)	**0.803*** (0.018)	0.883 (0.145)
Requires Proven Effective Instructors	0.973 (0.911)	0.827 (0.377)	0.869 (0.567)	0.763 (0.223)	0.780 (0.299)	0.799 (0.320)	0.990 (0.967)	0.885 (0.568)	1.093 (0.694)	1.079 (0.723)
TPP Gathers Information Regarding Cooperating Teachers' Mentoring Quality AND Effectiveness	1.264 (0.361)	1.480 (0.120)	1.144 (0.653)	1.394 (0.259)	1.365 (0.242)	1.315 (0.388)	1.048 (0.862)	1.064 (0.841)	1.152 (0.617)	0.974 (0.924)
TPP Gathers Information Regarding EITHER Cooperating Teachers' Mentoring Quality OR Effectiveness	1.251 (0.281)	1.156 (0.428)	1.218 (0.263)	1.097 (0.572)	**1.574*** (0.028)	**1.396**+ (0.071)	**1.519*** (0.033)	**1.369**+ (0.075)	1.329 (0.158)	1.060 (0.747)
TPP Gathers Any Substantive Data	1.047 (0.847)	1.109 (0.623)	1.369 (0.140)	**1.399**+ (0.073)	1.366 (0.136)	**1.433**+ (0.070)	1.204 (0.398)	1.193 (0.392)	**1.428**+ (0.099)	**1.444**+ (0.056)
Cases	**3,890**	**5,373**	**3,890**	**5,372**	**3,890**	**5,372**	**3,889**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses. The reference category is three or fewer required observations.*

Outcomes Indicators

Table 25: Elementary Grades Value-Added

	Elementary Mathematics				Elementary Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Surveys Graduates	-0.006 (0.055)	-0.014 (0.049)	0.024 (0.042)	0.009 (0.042)	0.008 (0.032)	0.015 (0.026)	0.007 (0.029)	0.016 (0.024)
Surveys Employers	0.027 (0.033)	**0.056**$^{+}$ (0.028)	0.004 (0.030)	0.031 (0.028)	0.008 (0.026)	0.012 (0.023)	0.002 (0.022)	0.008 (0.020)
Collects TPA	0.030 (0.049)	0.017 (0.042)	-0.000 (0.038)	-0.005 (0.037)	-0.014 (0.025)	-0.013 (0.022)	-0.014 (0.023)	-0.018 (0.019)
Collects Student Achievement Data	0.043 (0.028)	0.041 (0.024)	**0.040**$^{+}$ (0.023)	**0.036**$^{+}$ (0.021)	**0.072**** (0.018)	**0.051**** (0.016)	**0.055**** (0.015)	**0.039**** (0.013)
Collects Data Every 3 Years	0.004 (0.058)	-0.012 (0.050)	-0.007 (0.044)	-0.011 (0.043)	-0.014 (0.036)	-0.012 (0.031)	-0.007 (0.030)	-0.010 (0.026)
Cases	**19,198**	**25,698**	**24,295**	**32,376**	**21,974**	**29,511**	**26,935**	**35,991**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 26: Middle Grades Value-Added

	Middle Grades Mathematics				Middle Grades Reading			
	Case-Wise Deletion		Multiple Imputation		Case-Wise Deletion		Multiple Imputation	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Surveys Graduates	0.062 (0.056)	0.052 (0.052)	0.074 (0.059)	0.063 (0.051)	0.012 (0.040)	0.033 (0.033)	0.005 (0.041)	0.022 (0.037)
Surveys Employers	0.023 (0.032)	0.004 (0.034)	0.023 (0.035)	0.002 (0.035)	0.021 (0.018)	0.029 (0.017)	0.019 (0.018)	0.025 (0.018)
Collects TPA	0.009 (0.041)	0.003 (0.034)	-0.004 (0.044)	-0.006 (0.036)	**-0.044**$^{+}$ (0.025)	-0.031 (0.023)	-0.038 (0.027)	-0.026 (0.026)
Collects Student Achievement Data	-0.029 (0.040)	-0.046 (0.033)	-0.010 (0.039)	-0.017 (0.032)	-0.003 (0.023)	0.013 (0.020)	0.028 (0.021)	**0.034**$^{+}$ (0.019)
Collects Data Every 3 Years	0.026 (0.054)	0.025 (0.052)	0.011 (0.056)	0.015 (0.050)	-0.034 (0.037)	-0.042 (0.033)	-0.019 (0.038)	-0.030 (0.035)
Cases	**16,477**	**23,007**	**18,195**	**25,640**	**16,836**	**22,924**	**18,770**	**25,602**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Outcomes Indicators

Table 27: Algebra I EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Surveys Graduates	0.072 (0.076)	0.061 (0.072)	0.066 (0.074)	0.064 (0.072)
Surveys Employers	-0.025 (0.048)	-0.034 (0.041)	-0.010 (0.046)	-0.024 (0.042)
Collects TPA	0.037 (0.069)	0.021 (0.058)	0.030 (0.064)	0.008 (0.055)
Collects Student Achievement Data	**0.112*** (0.056)	**0.099**$^{+}$ (0.053)	0.041 (0.048)	0.032 (0.045)
Collects Data Every 3 Years	0.029 (0.077)	0.032 (0.069)	0.030 (0.075)	0.028 (0.069)
Cases	**7,291**	**10,351**	**8,483**	**12,155**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 28: Biology EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Surveys Graduates	0.098 (0.114)	-0.016 (0.117)	0.070 (0.139)	0.021 (0.136)
Surveys Employers	-0.003 (0.051)	-0.043 (0.054)	-0.024 (0.057)	-0.043 (0.057)
Collects TPA	-0.015 (0.073)	0.076 (0.069)	-0.003 (0.099)	0.068 (0.090)
Collects Student Achievement Data	**-0.184**** (0.056)	-0.112 (0.077)	**-0.162*** (0.062)	**-0.131**$^{+}$ (0.072)
Collects Data Every 3 Years	-0.033 (0.097)	0.113 (0.101)	-0.030 (0.125)	0.077 (0.123)
Cases	**4,302**	**6,456**	**4,846**	**7,405**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Table 29: English I/II EOC Value-Added

	Case-Wise Deletion		Multiple Imputation	
	1st Year	**1st and 2nd Year**	**1st Year**	**1st and 2nd Year**
Surveys Graduates	0.064 (0.063)	0.017 (0.052)	0.051 (0.068)	0.020 (0.050)
Surveys Employers	-0.070 (0.053)	-0.074 (0.048)	-0.070 (0.053)	-0.066 (0.045)
Collects TPA	-0.000 (0.049)	0.034 (0.041)	0.009 (0.051)	0.030 (0.038)
Collects Student Achievement Data	-0.042 (0.053)	-0.076 (0.048)	-0.052 (0.052)	**-0.078**$^{+}$ (0.044)
Collects Data Every 3 Years	-0.039 (0.091)	0.006 (0.071)	-0.023 (0.090)	-0.001 (0.064)
Cases	**6,241**	**8,811**	**6,546**	**9,228**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

Outcomes Indicators

Table 30: Evaluation Ratings with Case-Wise Deletion

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Surveys Graduates	1.292 (0.184)	1.049 (0.791)	1.172 (0.389)	1.144 (0.404)	1.111 (0.578)	1.087 (0.637)	1.015 (0.937)	1.046 (0.800)	0.925 (0.689)	0.929 (0.667)
Surveys Employers	**0.797*** (0.045)	**0.782*** (0.014)	**0.826**$^{+}$ (0.068)	**0.757**** (0.003)	**0.659**** (0.000)	**0.681**** (0.000)	**0.663**** (0.000)	**0.643**** (0.000)	**0.726**** (0.004)	**0.762**** (0.007)
Collects TPA	**0.726*** (0.043)	0.891 (0.435)	0.896 (0.471)	0.999 (0.998)	0.888 (0.442)	0.930 (0.626)	0.961 (0.807)	0.976 (0.875)	1.060 (0.723)	1.066 (0.656)
Collects Student Achievement Data	1.189 (0.125)	**1.261*** (0.026)	**1.273*** (0.029)	**1.282*** (0.012)	**1.325*** (0.013)	**1.346**** (0.004)	**1.226**$^{+}$ (0.059)	**1.263*** (0.020)	**1.389**** (0.002)	**1.357**** (0.002)
Collects Data Every 3 Years	1.052 (0.795)	1.256 (0.206)	1.204 (0.330)	**1.384**$^{+}$ (0.052)	1.365 (0.106)	**1.374**$^{+}$ (0.082)	**1.585*** (0.019)	**1.561*** (0.015)	**1.516*** (0.036)	1.328 (0.107)
Cases	**3,331**	**4,608**	**3,331**	**4,607**	**3,331**	**4,607**	**3,330**	**4,607**	**3,331**	**4,607**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*

Table 31: Evaluation Ratings with Multiple Imputation

	Leadership		Classroom Environment		Content Knowledge		Facilitating Student Learning		Reflecting on Practice	
	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year	1st Year	1st and 2nd Year
Surveys Graduates	1.239 (0.206)	1.095 (0.566)	1.194 (0.270)	1.207 (0.181)	1.169 (0.391)	1.141 (0.432)	1.122 (0.495)	1.137 (0.395)	1.064 (0.721)	1.036 (0.820)
Surveys Employers	**0.805**$^{+}$ (0.053)	**0.814*** (0.037)	**0.832**$^{+}$ (0.073)	**0.780**** (0.006)	**0.712**** (0.003)	**0.740**** (0.003)	**0.712**** (0.001)	**0.700**** (0.000)	**0.768*** (0.017)	**0.795*** (0.020)
Collects TPA	**0.770**$^{+}$ (0.062)	0.879 (0.313)	0.874 (0.316)	0.948 (0.655)	0.871 (0.350)	0.911 (0.495)	0.913 (0.523)	0.935 (0.595)	0.962 (0.795)	0.981 (0.886)
Collects Student Achievement Data	1.122 (0.223)	**1.172**$^{+}$ (0.064)	1.104 (0.284)	1.112 (0.202)	1.171 (0.101)	**1.212*** (0.027)	1.132 (0.176)	**1.152**$^{+}$ (0.090)	1.143 (0.157)	1.151 (0.104)
Collects Data Every 3 Years	1.097 (0.578)	1.193 (0.242)	1.155 (0.362)	**1.268**$^{+}$ (0.088)	1.225 (0.265)	1.248 (0.191)	**1.393*** (0.048)	**1.376*** (0.033)	1.258 (0.191)	1.157 (0.348)
Cases	**3,890**	**5,373**	**3,890**	**5,372**	**3,890**	**5,372**	**3,889**	**5,372**	**3,890**	**5,372**

*Note: +, *, and ** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. Cells report odds ratios with p-values in parentheses.*