



MICHIGAN TEST FOR TEACHER CERTIFICATION

Technical Report: Appendices

OCTOBER 2015–SEPTEMBER 2016

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Michigan Test for Teacher Certification

Technical Report: Appendices

Test Statistics

October 1, 2015 – September 30, 2016

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MTTC Technical Report

Test Statistics: October 1, 2015 – September 30, 2016

Section I: Overview

Volume II of the MTTC Technical Report provides test statistics for test forms administered to at least 10 examinees during test administrations between October 1, 2015 and September 30, 2016. Total test statistics are provided as the basis for understanding the usefulness of the test for licensing decisions. Additional statistical information is provided for tests administered to at least 60 examinees. These statistics provide further information for the multiple-choice items and for the performance assignment(s) on the Professional Readiness Examination (PRE) Writing subtest, each of the World Language tests except Italian (including Arabic [Modern Standard], Chinese [Mandarin], French, German, Japanese, Russian, and Spanish), and Latin.

Aids to Interpreting the MTTC Statistics

A large amount of statistical information is presented in the reports that follow. Readers may benefit from a number of interpretive aids while considering these data.

- Information presented in these reports is based on four paper-based administrations of the MTTC tests, and eight computer-based testing windows at which selected tests were administered; it is possible that information based on additional test administrations might be different.
- Information in these reports that is based on the test performance of relatively small numbers of examinees (i.e., fewer than 60 examinees) may not be indicative of the performance of larger numbers of examinees.

- The MTTC tests include multiple-choice items and performance assignments. Procedures for estimating the psychometric characteristics of multiple-choice items and tests are well-established and documented in the literature; such procedures for performance assignments, and for tests that combine performance assignments and multiple-choice items, are less well-established and documented. Most MTTC tests presently consist of multiple-choice items only. The Writing subtest of the Professional Readiness Examination (previously the Basic Skills test) consists of a written performance assignment. Each of the MTTC World Language tests except Italian, as well as the Latin test, consists of a multiple-choice section and a performance assignment section. The Spanish, French, German, and Latin content-area tests each include two written performance assignments. The Chinese (Mandarin), Arabic (Modern Standard), Russian, and Japanese tests each contain eight performance assignments.
- The scores that are reported on the MTTC are scaled scores. They have been converted mathematically to a scale with a lower limit of 100, a passing score of 220, and an upper limit of 300. This is the scale used in reporting all MTTC scaled score statistics.

Test Reliability: Overview

As a term used in testing, “reliability/precision” may be defined as “the degree to which test scores for a group of test takers are consistent over repeated applications of a measurement procedure and hence are inferred to be dependable and consistent for an individual test taker; the degree to which scores are free of random errors of measurement for a given group” (*Standards for Educational and Psychological Testing (AERA, APA & NCME, 2014, p. 222)*).

Every test (in fact, every measurement tool) can be expected to produce some measurement error; well-constructed tests produce a small amount of measurement error and generally yield consistent results from one measurement occasion (i.e., test administration) to another.

The process that was used to develop the Michigan Test for Teacher Certification contained features designed to ensure, to the extent possible, that the content and format of the tests would contribute to the stability of the scores derived from them. Test content is based on Michigan regulations, documents, and resources, and was reviewed for accuracy and edited for clarity. Test items were reviewed to ensure that they relate to knowledge and skills judged to be important to the job of an educator entering teaching in Michigan schools.

For the performance assignments, scoring procedures were carefully designed to include detailed orientation, explicit scoring scales and standards, and ongoing verification of scorer accuracy and consistency. Test administration conditions are standardized to be consistent across test sites and occasions.

Statistical estimates of reliability focus on the results of tests—the scores achieved by specific groups of examinees. To the extent that the quality of test materials and procedures can contribute to the underlying reliability and consistency of test scores, the Michigan Tests for Teacher Certification have been developed to ensure high test quality and to affect procedural consistency in test development, administration, and scoring.

Factors that affect statistical estimates of test reliability. Reliability is a property of test scores for a particular group of examinees, not a fixed property of a test. Many factors may affect statistical estimates of test reliability, among them the following.

Number of examinees. The number of examinees whose test scores contribute to a statistical estimate of reliability affects the stability of the estimate. Estimates based on smaller numbers of examinees are typically less stable than estimates based on larger numbers. For this reason, statistical estimates of reliability are calculated for the MTTC only for those tests that are taken by 60 or more examinees.

Self-selection of examinees by test administration date. Typically, examinees can decide when to take a particular test. The tests are offered multiple times per year, and examinees can select when to take and retake the tests. This self-selection can affect the composition, ability level, and variability of the group taking a particular test at a given test administration.

Variability of the group tested. In general, the larger the true variance or true spread of the scores of the examinee group (i.e., the greater the individual differences in the true level of knowledge and skills of the examinees in the particular group taking a test on a particular occasion), the greater will be the reliability coefficient. If the examinees on a particular occasion have generally similar levels of knowledge and skills, statistical estimates of reliability may tend to be lower.

Composite tests. Statistical estimates of reliability for tests that are composites of different types of items (e.g., multiple-choice items and performance assignments) tend to be more relevant when they are calculated on the combined, total test than when they are based on any single component (i.e., multiple-choice items alone or performance assignments alone).

Test content. Statistical estimates of reliability tend to be higher for tests that cover narrower, more homogeneous ranges of content than for tests that cover broad, varied ranges of content. Tests for educator licensure typically must test a broad base of knowledge and skills that pertain to licenses that will apply in a wide range of educational settings, grade levels, and teaching assignments.

Statistical procedures. One approach to gauging the reliability of a test is through the use of statistical procedures. As is the case with most statistical measures of test score reliability, the estimates to be included will be reported on a scale ranging from zero to one (i.e., 0.00 to 1.00). While there is no fixed standard that distinguishes “reliable” test scores from “unreliable” ones, the U.S. Department of Labor Employment and Training Administration has published in a guide, titled *Testing and Assessment: An Employer’s Guide to Good Practices*, the following general guidelines for interpreting reliability coefficients (U.S. DOL, 1999, p. 3):

<u>Reliability coefficient value</u>	<u>Interpretation</u>
.90 and up	Excellent
.80–.89	Good
.70–.79	Adequate
Below .70	May have limited applicability

Adequate numbers of examinees. Statistical reliability estimates, if they are to be interpreted with any degree of confidence, must be based on adequate numbers of examinee scores that may represent some range of examinee knowledge and skill levels and that may provide some variance in examinee score distributions. Statistical reliability estimates based on few examinee scores may be highly dependent on the characteristics of those few examinees and their scores. For this reason, statistical test data are provided in this report only for test fields in which 60 or more examinees take a test at any of the operational test administrations, either paper-based or computer-based, in the program year.

Statistical measures used. A number of statistical techniques have been devised for measuring the consistency (i.e., reliability) of test scores; the choice of a specific index is based on its characteristics, precision, and practicability (Berk, 1980). The indices provided in this report are generally recommended for single-test estimation of test reliability and/or for tests comprising performance assignments and multiple-choice items.

Each statistical procedure selected for the Michigan Test for Teacher Certification provides different information about the reliability of the tests. Measures are reported for the total test and, when applicable, for each test section. However, because pass/fail decisions are made based upon the total test score only, total test reliability is the focus of interest; measures of reliability for individual sections of the test are presented for descriptive purposes only. When considering a reliability index for a single test section, it is important to keep in mind that one section of a test is usually less reliable than the total test because the test section contains fewer test items than the total test.

The statistics that are of primary interest, however, are those that describe the consistency of pass/fail decisions on the total test and the error of measurement associated with the total test. These statistics are provided in the Test Statistics Report by Test Form, which provides information on all tests; and the Test Statistics Report by Test Field, which provides information on tests with performance assignments.

Reliability estimates for the individual sections of the tests (i.e., multiple-choice and performance assignment) are also provided for descriptive purposes only in the Test Statistics Report by Test Form. These reliability estimates should not be used in place of the total test decision consistency estimates provided.

Organization of the Data

The following reports are presented.

- Test Statistics Report by Test Form, which provides information beginning with the Professional Readiness Examination (Mathematics, Reading, and Writing), followed by all other test fields in alphabetical order, and in form order (A, B, C, etc.) within each field where more than one form has been administered. Tests for which no examinees registered during this reporting period will appear in the report with no data provided.
- Test Statistics Report by Test Field (All Forms): Performance Assignments, which provides information on tests with performance assignments beginning with the Professional Readiness Examination (Writing), followed by all other test fields with performance assignments in alphabetical order. Tests for which no examinees registered during this reporting period will appear in the report with no data provided.
- Total Scaled Score Distribution by Test Field (All Forms), beginning with the Professional Readiness Examination (Mathematics, Reading, and Writing), followed by all other test fields with 10 or more test-takers in alphabetical order. Tests for which no examinees registered during this reporting period will not appear in the report.

The table on the following pages comprises a historical list of all MTTC tests in field number order, as of October 1, 2015. Note that some fields, such as 001 Language Arts, are no longer active because they have been replaced due to subsequent changes in the testing program

Historical List of MTTC Tests in Field Number Order

Field Number	Field Name
002	English
003	Journalism
004	Speech
005	Reading
007	Economics
008	Geography
009	History
010	Political Science
011	Psychology
012	Sociology
013	Anthropology
014	Cultural Studies
015	Behavioral Studies
016	Science
017	Biology
018	Chemistry
019	Physics
020	Earth/Space Science
022	Mathematics (Secondary)
023	French
024	German
026	Latin
027	Russian
028	Spanish
029	Italian
032	Business Education
033	Accounting
034	Business Administration
036	Marketing (Distributive Education)
037	Agricultural Education
039	Music Education
040	Family and Consumer Sciences
041	Art Education
042	Health, Physical Education, Recreation

043	Health
044	Physical Education
046	Dance
048	Library Media
049	Environmental Studies
050	Computer Science
051	School Counselor
053	Fine Arts
054	Humanities
056	Mentally Impaired
057	Speech and Language Impaired
058	Physically or Otherwise Health Impaired
059	Emotional Impairment (formerly Emotionally Impaired)
061	Visually Impaired
062	Hearing Impaired
063	Learning Disabled
064	Autism Spectrum Disorder (formerly Autistic)
065	Bilingual French
066	Bilingual German
067	Bilingual Greek
069	Bilingual Russian
070	Bilingual Spanish
071	Bilingual Italian
072	Bilingual Polish
073	Bilingual Hebrew
074	Bilingual Arabic
075	Bilingual Other
076	Bilingual Vietnamese
077	Bilingual Korean
078	Bilingual Yugoslavian
079	Bilingual Chaldean
080	Bilingual Chinese
081	Bilingual Japanese
082	Early Childhood Education
083	Elementary Education (Replaced with 103 Elementary Education)
084	Social Studies (Secondary)

085	Middle Level
086	English as a Second Language
087	Industrial Technology
088	Technology and Design
089	Mathematics (Elementary)
090	Language Arts (Elementary)
091	Communication Arts (Secondary)
092	Reading Specialist
093	Integrated Science (Elementary)
094	Integrated Science (Secondary)
095	Visual Arts Education
097	Physical Science
098	Business, Management, Marketing and Technology
099	Music
100	Japanese
101	Chinese (Mandarin)
102	Arabic (Modern Standard)
103	Elementary Education
105	Social Studies (Elementary)
106	Early Childhood Education (General and Special Education)
196	Professional Readiness Examination (formerly Basic Skills): Reading subtest
296	Professional Readiness Examination (formerly Basic Skills): Mathematics subtest
396	Professional Readiness Examination (formerly Basic Skills): Writing subtest

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MTTC Technical Report

Test Statistics: October 1, 2015 – September 30, 2016

Section II: Test Statistics Report by Test Form and Test Statistics Report by Test Field

The Test Statistics Report by Test Form provides selected statistics for each test form administered to at least 10 examinees during the program year. The report includes the following information:

- Test Field Name
- Form Designation (A, B, C, etc.). For each test field, one or more different test forms—each comprising a different set of scorable multiple-choice items and/or different performance assignments—were administered during the reporting period. Data for the same test forms that were administered more than once during the reporting period are combined in this report. It is important to note that comparisons of performance across test forms are subject to a number of variables, including the sample of examinees taking each test form, which changes depending on the time of year of the test administration; the proportion of retakers taking each test form; and other factors. Also note that differences in the number of examinees taking each test form may be due to the fact that the results presented in the current report are based only on administrations within the indicated date window.
- Number of Tests Taken. Scores are included in the analyses for this report for examinees who attempted at least one multiple-choice item and provided scorable responses on the performance assignment sections.
- Mean Scaled Score. The mean of the total test scaled score achieved by the examinees taking the test form is reported for each test form taken by 10 or more examinees.

- Total Test S.E.M. The standard error of measurement of the total test scaled scores is reported for each test form taken by 60 or more examinees. Total test standard error of measurement (S.E.M.) is estimated as the square root of the absolute error variance for a composite score (Brennan, 2001). This statistic serves as a measure of total test consistency.
- Total Test Decision Consistency. The total test decision (i.e., pass vs. fail) consistency of the total test scaled score is reported for each test form taken by 60 or more examinees. The estimate of total test decision consistency provided is the model suggested by Breyer and Lewis (1994). This is a single-test estimate of total test decision consistency for tests with multiple item formats. Each test is carefully divided to create two halves that are parallel in terms of item content and as equivalent as practicable in terms of item statistics. The decision consistency statistic is reported in the range of 0.00 to 1.00; the closer the estimate is to 1.00, the more consistent (reliable) the decision is considered to be.
- Stratified Coefficient Alpha. The stratified alpha score is reported for each test form taken by 60 or more examinees. Stratified coefficient alpha is an estimate of total test reliability for a test containing a mixture of item types (e.g. multiple-choice, open response or essay) (Qualls 1995). Each item type component of the test is treated as a subtest. Internal consistency estimates for the separate subtests are combined to compute stratified coefficient alpha. Stratified coefficient alpha is reported in the range .00 to 1.00, with a higher number indicating a greater level of consistency (reliability). This statistical estimate was deemed most appropriate for estimating total reliability of some tests with mixed item formats in this testing program because it takes into account differences in length and variance of each subtest.
- Length. The length indicates the number of scorable items included in the multiple-choice section of the test form.

The report also contains the following information for each test form taken by 60 or more examinees.

- **KR20:** For the multiple-choice section: Kuder-Richardson 20 (KR-20). The KR-20 is an overall test consistency (reliability) estimate based on a single test administration (Kuder & Richardson, 1937). It is generally applicable to tests composed of multiple-choice items. KR-20 is reported in the range 0.00 to 1.00, with a higher number indicating a greater level of consistency (reliability). Homogeneity refers to the degree to which the items on the test are consistent with one another. KR-20 is a special case of the Alpha Coefficient and as such can be considered the lower bound of a theoretical reliability coefficient (Crocker & Algina, 1986).
- **G Coefficient:** For the performance assignment section: Generalizability (G) Coefficient. The Generalizability (G) coefficient is a measure of the percent of total score variance that is attributable to persons (i.e., factors within the candidate, such as subject matter knowledge). It reflects the proportion of variability in individuals' scores that is attributable to true score variability rather than to measurement error (Brennan, 2001). It is reported in the range 0.00 to 1.00, with a higher number indicating a greater level of generalizability. The G coefficient is generally applicable to tests composed of open-response items; it gauges the degree to which the results from one test form of the open-response items are generalizable to other forms or other test administrations.

The Test Statistics Report by Test Field contains the following information for each assignment included in the performance assignment section of each test taken by 60 or more examinees.

- **Number of Tests Taken.** The number of tests taken indicates the number of tests taken during the date range indicated.
- **Scorer Agreement.** The scoring process documents the number of scorings and the individual scores that each response has received; for this report, the percent of cases in which the first two scorers were in agreement (i.e., assigned identical or adjacent scores), broken down by the percent in exact agreement and the percent that assigned adjacent scores, is provided. (Note: As described in Volume I, scores that are not in agreement after the first two scorings are resolved through additional scoring and review. For the Basic Skills Writing test, all responses that receive a “borderline” total score of “5” are also resolved, so that the final scores assigned are either “2,” “3,” “4,” “6,” “7,” or “8.”

This ensures that all failing papers have received scores of “1” or “2” from at least two scorers, and all passing papers have received scores of “3” or “4” from at least two scorers.)

- Inter-rater Reliability. Another procedure used for computing scorer consistency is the intraclass correlation between the first and second score assigned to each response (Snedecor & Cochran, 1967), corrected using the Spearman-Brown formula (McNemar, 1969). (Note: This correlation may be limited by the restriction of range attributable to the fact that only scores ranging from “1” to “4” are assigned to each scorer.)

**Test Statistics Report by Test Form
and Test Statistics Report by Test Field
(All Forms: Performance Assignments)**

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Professional Readiness Examination-Reading Subtest (196)	A	296	222	20.8	0.83	--	36	0.81	--
	B	345	237	17.9	0.85	--	36	0.81	--
	C	165	239	19.3	0.83	--	36	0.82	--
	D	605	203	20.7	0.83	--	36	0.86	--
	E	138	252	17.2	0.92	--	36	0.78	--
	F	174	251	17.3	0.91	--	36	0.78	--
	G	696	205	20.7	0.82	--	36	0.86	--
	H	155	226	19.5	0.87	--	36	0.88	--
	J	117	244	19.3	0.92	--	36	0.87	--
	K	423	221	19.8	0.81	--	36	0.83	--
Professional Readiness Examination-Mathematics Subtest (296)	A	486	190	19.2	0.83	--	40	0.80	--
	B	555	193	19.2	0.82	--	40	0.82	--
	C	306	196	19.1	0.80	--	40	0.80	--
	D	785	173	20.4	0.90	--	40	0.84	--
	E	209	193	19.3	0.83	--	40	0.84	--
	F	296	194	19.2	0.85	--	40	0.83	--
	G	877	176	19.0	0.87	--	40	0.85	--
	H	259	197	19.3	0.81	--	40	0.82	--

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**Michigan Test For Teacher Certification (MTTC)
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Test Statistics Report by Test Form**

Test Field	Form	Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Professional Readiness Examination-Mathematics Subtest (296)	J	200	190	19.6	0.83	--	40	0.79	--
	K	591	170	21.3	0.85	--	40	0.81	--
Professional Readiness Examination-Writing Subtest (396)	A	699	182	16.2	0.89	0.75	36	0.74	0.53
	B	807	192	16.5	0.86	0.73	36	0.71	0.51
	C	383	193	16.1	0.87	0.76	36	0.74	0.54
	D	1,027	170	15.6	0.91	0.85	36	0.83	0.70
	E	332	194	17.2	0.87	0.72	36	0.71	0.46
	F	435	195	16.5	0.83	0.72	36	0.69	0.55
	G	1,098	176	16.0	0.91	0.84	36	0.82	0.68
	H	336	192	16.3	0.88	0.79	36	0.77	0.61
	J	249	196	15.5	0.86	0.80	36	0.77	0.63
	K	771	183	15.2	0.90	0.80	36	0.80	0.60
Agricultural Education (037)	A	2	--	--	--	--	64	--	--
	B	4	--	--	--	--	64	--	--
Arabic (Modern Standard) (102)	A	23	234	--	--	--	28	--	--

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

Test Field	Form	Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Autism Spectrum Disorder (064)	A	82	234	12.0	0.84	--	80	0.74	--
	B	27	234	--	--	--	80	--	--
	C	29	239	--	--	--	80	--	--
	D	26	237	--	--	--	80	--	--
	E	9	--	--	--	--	80	--	--
Bilingual Education (075)	A	3	--	--	--	--	80	--	--
	B	8	--	--	--	--	80	--	--
Biology (017)	A	111	227	10.8	0.84	--	80	0.82	--
	B	48	228	--	--	--	80	--	--
	C	40	227	--	--	--	80	--	--
Business, Management, Marketing, & Tech. (098)	A	12	229	--	--	--	80	--	--
	B	18	229	--	--	--	80	--	--
Chemistry (018)	A	48	225	--	--	--	80	--	--
	B	9	--	--	--	--	80	--	--
	C	18	242	--	--	--	80	--	--
Chinese (Mandarin) (101)	A	25	241	--	--	--	28	--	--
Cognitive Impairment (056)	A	221	220	13.7	0.77	--	80	0.77	--
	B	226	224	13.6	0.75	--	80	0.75	--

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		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Communication Arts (Secondary) (091)	A	7	--	--	--	--	80	--	--
	B	7	--	--	--	--	80	--	--
Computer Science (050)	A	6	--	--	--	--	80	--	--
	B	3	--	--	--	--	80	--	--
Dance (046)	A	10	242	--	--	--	80	--	--
	B	1	--	--	--	--	80	--	--
Early Childhood Education (General and Special Education) (106)	A	383	218	16.5	0.78	--	80	0.80	--
	B	68	218	16.5	0.82	--	80	0.79	--
	C	68	225	15.9	0.84	--	80	0.79	--
	D	89	216	16.5	0.74	--	80	0.81	--
	E	89	220	16.2	0.78	--	80	0.79	--
Earth/Space Science (020)	A	22	228	--	--	--	80	--	--
	B	12	227	--	--	--	80	--	--
Economics (007)	A	8	--	--	--	--	80	--	--
	B	7	--	--	--	--	80	--	--

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**Michigan Test For Teacher Certification (MTTC)
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Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Elementary Education (103)	A	836	233	9.1	0.87	--	120	0.90	--
	B	59	218	--	--	--	120	--	--
	C	75	226	9.6	0.83	--	120	0.86	--
	D	682	228	9.5	0.85	--	120	0.89	--
	E	694	228	9.3	0.84	--	120	0.89	--
	F	698	227	9.2	0.86	--	120	0.90	--
Emotional Impairment (059)	A	81	226	12.4	0.77	--	80	0.77	--
	B	69	234	12.1	0.84	--	80	0.73	--
English (002)	A	37	227	--	--	--	80	--	--
	B	21	231	--	--	--	80	--	--
	C	19	237	--	--	--	80	--	--
	D	115	229	11.8	0.87	--	80	0.84	--
	E	116	234	11.8	0.85	--	80	0.82	--
	F	251	231	11.5	0.86	--	80	0.84	--
English as a Second Language (086)	A	36	238	--	--	--	80	--	--
	B	56	242	--	--	--	80	--	--
	C	82	239	10.9	0.92	--	80	0.83	--
	D	155	236	11.2	0.85	--	80	0.87	--

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		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Family and Consumer Sciences (040)	A	6	--	--	--	--	80	--	--
	B	8	--	--	--	--	80	--	--
Fine Arts (053)	A	5	--	--	--	--	80	--	--
	B	3	--	--	--	--	80	--	--
French (023)	A	24	224	--	--	--	64	--	--
	B	10	216	--	--	--	64	--	--
Geography (008)	A	27	210	--	--	--	80	--	--
German (024)	A	6	--	--	--	--	64	--	--
	B	6	--	--	--	--	64	--	--
Health (043)	A	60	233	12.1	0.84	--	80	0.84	--
	B	31	241	--	--	--	80	--	--
	C	41	244	--	--	--	80	--	--
Hearing Impaired (062)	A	1	--	--	--	--	80	--	--
	B	7	--	--	--	--	80	--	--
History (009)	A	106	215	11.3	0.83	--	80	0.82	--
	B	85	210	11.4	0.82	--	80	0.76	--
	C	107	214	11.3	0.81	--	80	0.80	--
	D	109	214	11.2	0.81	--	80	0.85	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Industrial Technology (087)	A	10	234	--	--	--	80	--	--
	B	3	--	--	--	--	80	--	--
Integrated Science (Elementary) (093)	A	43	217	--	--	--	80	--	--
	B	16	220	--	--	--	80	--	--
	C	10	219	--	--	--	80	--	--
	D	56	225	--	--	--	80	--	--
	E	59	221	--	--	--	80	--	--
	F	163	224	9.9	0.85	--	80	0.85	--
Integrated Science (Secondary) (094)	A	85	228	11.0	0.89	--	80	0.86	--
	B	51	234	--	--	--	80	--	--
	C	47	227	--	--	--	80	--	--
Italian (029)	A	2	--	--	--	--	80	--	--
Japanese (100)	A	5	--	--	--	--	28	--	--
Journalism (003)	A	2	--	--	--	--	80	--	--
	B	2	--	--	--	--	80	--	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

Test Field	Form	Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Language Arts (Elementary) (090)	A	344	228	12.5	0.83	--	80	0.81	--
	B	26	231	--	--	--	80	--	--
	C	23	228	--	--	--	80	--	--
	D	133	233	12.3	0.82	--	80	0.76	--
	E	127	232	12.3	0.78	--	80	0.79	--
	F	71	227	12.4	0.76	--	80	0.85	--
Latin (026)	A	3	--	--	--	--	64	--	--
Learning Disabilities (063)	A	129	235	11.5	0.87	--	80	0.85	--
	B	160	240	11.2	0.85	--	80	0.76	--
	C	75	230	11.5	0.87	--	80	0.83	--
Library Media (048)	A	14	217	--	--	--	80	--	--
	B	7	--	--	--	--	80	--	--
Marketing Education (036)	A	3	--	--	--	--	80	--	--
Mathematics (Elementary) (089)	A	51	235	--	--	--	64	--	--
	B	13	231	--	--	--	64	--	--
	C	9	--	--	--	--	64	--	--
	D	63	229	11.4	0.82	--	64	0.90	--
	E	238	239	10.8	0.85	--	64	0.89	--
	F	69	238	11.2	0.85	--	64	0.88	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

Test Field	Form	Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Mathematics (Secondary) (022)	A	234	239	11.3	0.88	--	64	0.90	--
	B	17	246	--	--	--	64	--	--
	C	16	253	--	--	--	64	--	--
	D	63	244	10.7	0.92	--	64	0.93	--
	E	69	241	10.8	0.90	--	64	0.92	--
Middle Level (085)	A	14	258	--	--	--	80	--	--
	B	5	--	--	--	--	80	--	--
Music Education (099)	A	118	250	9.2	0.93	--	80	0.79	--
	B	43	247	--	--	--	80	--	--
	C	47	247	--	--	--	80	--	--
	D	14	240	--	--	--	80	--	--
Physical Education (044)	A	102	218	14.3	0.77	--	80	0.80	--
	B	43	224	--	--	--	80	--	--
	C	47	227	--	--	--	80	--	--
Physical Science (097)	A	4	--	--	--	--	80	--	--
	B	1	--	--	--	--	80	--	--
Physical or Other Health Impairment (058)	A	5	--	--	--	--	80	--	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Physics (019)	A	30	228	--	--	--	80	--	--
	B	18	243	--	--	--	80	--	--
	C	10	225	--	--	--	80	--	--
Political Science (010)	A	20	188	--	--	--	80	--	--
	B	28	208	--	--	--	80	--	--
Psychology (011)	A	28	229	--	--	--	80	--	--
	B	22	233	--	--	--	80	--	--
	C	18	229	--	--	--	80	--	--
	D	25	221	--	--	--	80	--	--
Reading (005)	A	62	232	12.5	0.74	--	80	0.65	--
	B	24	232	--	--	--	80	--	--
	C	26	244	--	--	--	80	--	--
Reading Specialist (092)	A	42	243	--	--	--	80	--	--
	B	30	240	--	--	--	80	--	--
	C	45	244	--	--	--	80	--	--
	D	58	237	--	--	--	80	--	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
School Counselor (051)	A	95	244	10.5	0.89	--	80	0.81	--
	B	36	252	--	--	--	80	--	--
	C	53	253	--	--	--	80	--	--
Social Studies (Elementary) (105)	A	123	215	11.2	0.79	--	80	0.72	--
	B	66	218	10.6	0.72	--	80	0.74	--
	C	40	222	--	--	--	80	--	--
Social Studies (Secondary) (084)	A	140	227	10.2	0.86	--	80	0.83	--
	B	137	224	10.3	0.82	--	80	0.82	--
	C	147	222	10.4	0.80	--	80	0.79	--
	D	119	225	10.2	0.84	--	80	0.84	--
Sociology (012)	A	1	--	--	--	--	80	--	--
	B	4	--	--	--	--	80	--	--
	C	1	--	--	--	--	80	--	--
Spanish (028)	A	95	245	11.9	0.96	0.89	64	0.83	0.81
	B	32	240	--	--	--	64	--	--
	C	29	252	--	--	--	64	--	--
Speech (004)	A	23	263	--	--	--	80	--	--
	B	14	258	--	--	--	80	--	--

(Continued)

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Form**

		Number of Tests Taken	Total Test Scaled Score Indices				Multiple-Choice Section		Performance Assignment Section
			Mean	SEM	Decision Consistency	Stratified Alpha	Length	KR20	G Coefficient
Test Field	Form								
Speech and Language Impaired (057)	A	2	--	--	--	--	80	--	--
	B	4	--	--	--	--	80	--	--
Technology and Design (088)	A	2	--	--	--	--	80	--	--
	B	1	--	--	--	--	80	--	--
Visual Arts Education (095)	C	14	246	--	--	--	80	--	--
	D	23	243	--	--	--	80	--	--
	E	25	243	--	--	--	80	--	--
	F	49	240	--	--	--	80	--	--
Visually Impaired (061)	A	3	--	--	--	--	80	--	--

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**Michigan Test For Teacher Certification (MTTC)
October 1, 2015 - September 30, 2016
Test Statistics Report by Test Field (All Forms)**

	Number of Tests Taken	Performance Assignments							
		Item 1 of 2				Item 2 of 2			
		Scorer Agreement			Inter-rater Reliability	Scorer Agreement			Inter-rater Reliability
		Percent Agreement	Percent Exact	Percent Adjacent		Percent Agreement	Percent Exact	Percent Adjacent	
Professional Readiness Examination-Writing Subtest (396)	6,137	99.9	80.0	19.9	0.84	99.9	75.5	24.4	0.81
Arabic (Modern Standard) (102)	23	--	--	--	--	--	--	--	--
Chinese (Mandarin) (101)	25	--	--	--	--	--	--	--	--
French (023)	34	--	--	--	--	--	--	--	--
German (024)	24	--	--	--	--	--	--	--	--
Japanese (100)	5	--	--	--	--	--	--	--	--
Latin (026)	3	--	--	--	--	--	--	--	--
Russian (027)	0	--	--	--	--	--	--	--	--
Spanish (028)	156	100.0	80.6	19.4	0.91	98.7	77.9	20.8	0.88

MTTC Technical Report

Test Statistics: October 1, 2015 – September 30, 2016

Section III: Total Scaled Score Distribution by Test Field

The Total Scaled Score Distribution by Test Field report provides information about the scaled score distributions for the test fields taken by 10 or more examinees. For the MTTC, results are reported on a scale ranging from 100 to 300. A scaled score of 220 represents the minimum passing score for each test.

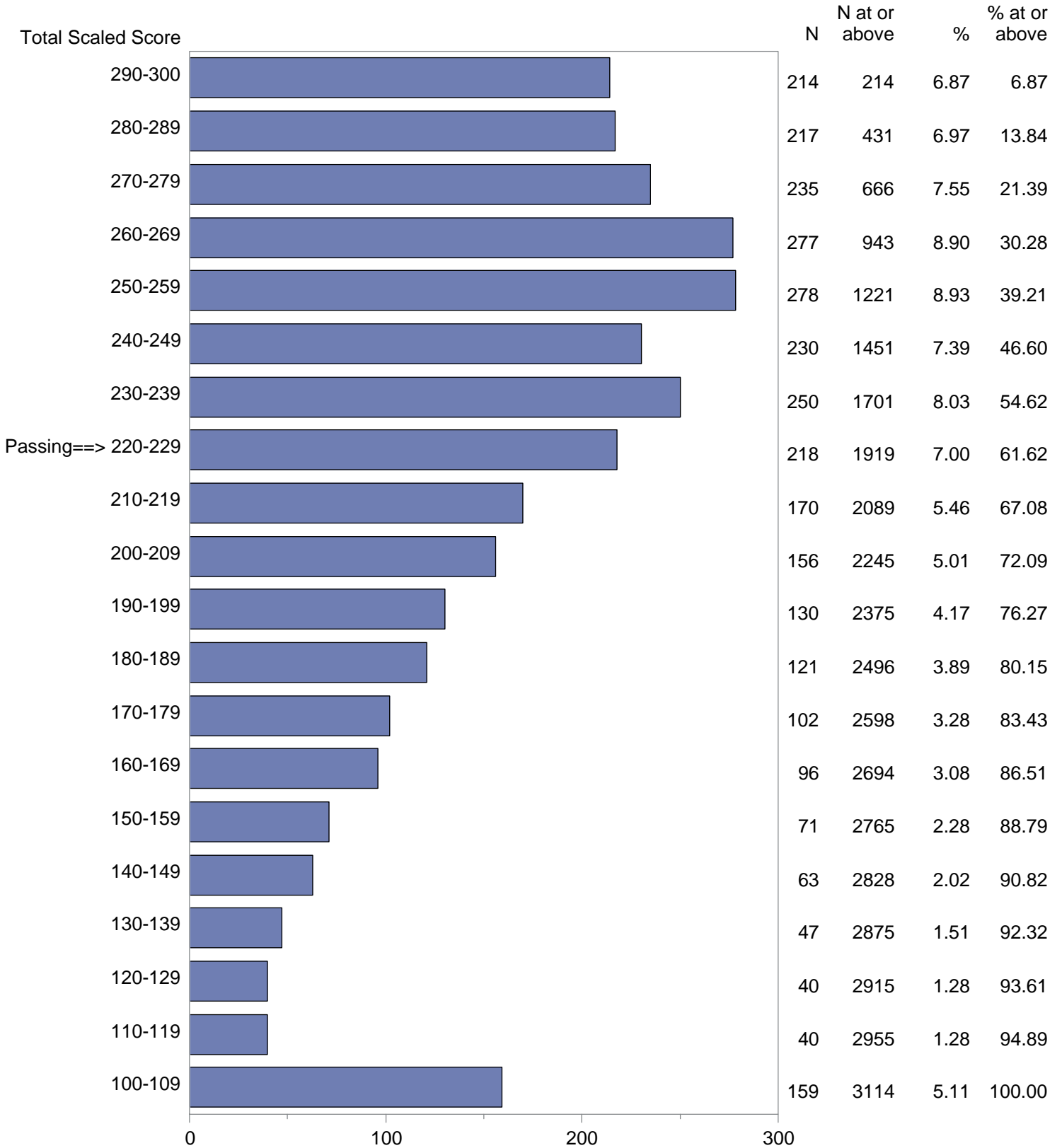
The reports include the following.

- Distribution of total scaled scores in 10-point increments
- N: the number of scores observed at the scaled scores within the 10-point range indicated
- N at or above: the number of scores observed at or above the lowest scaled score within the 10-point range indicated
- Percent: the percent of scores observed at the scaled scores within the 10-point range indicated
- % at or above: the percent of scores observed at or above the lowest scaled score within the 10-point range indicated

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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)

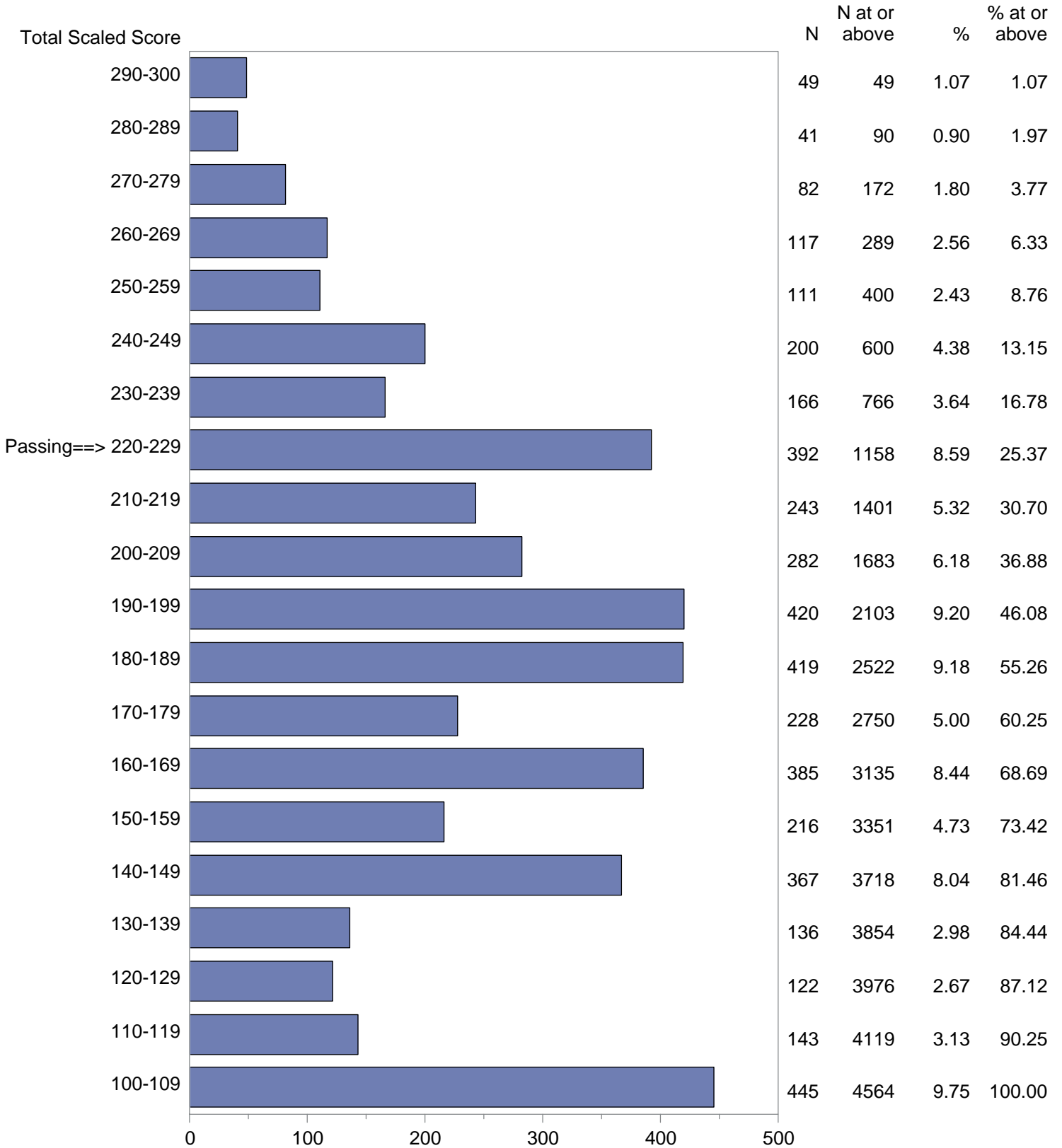
Test Field = Professional Readiness Examination-Reading Subtest (196)



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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)

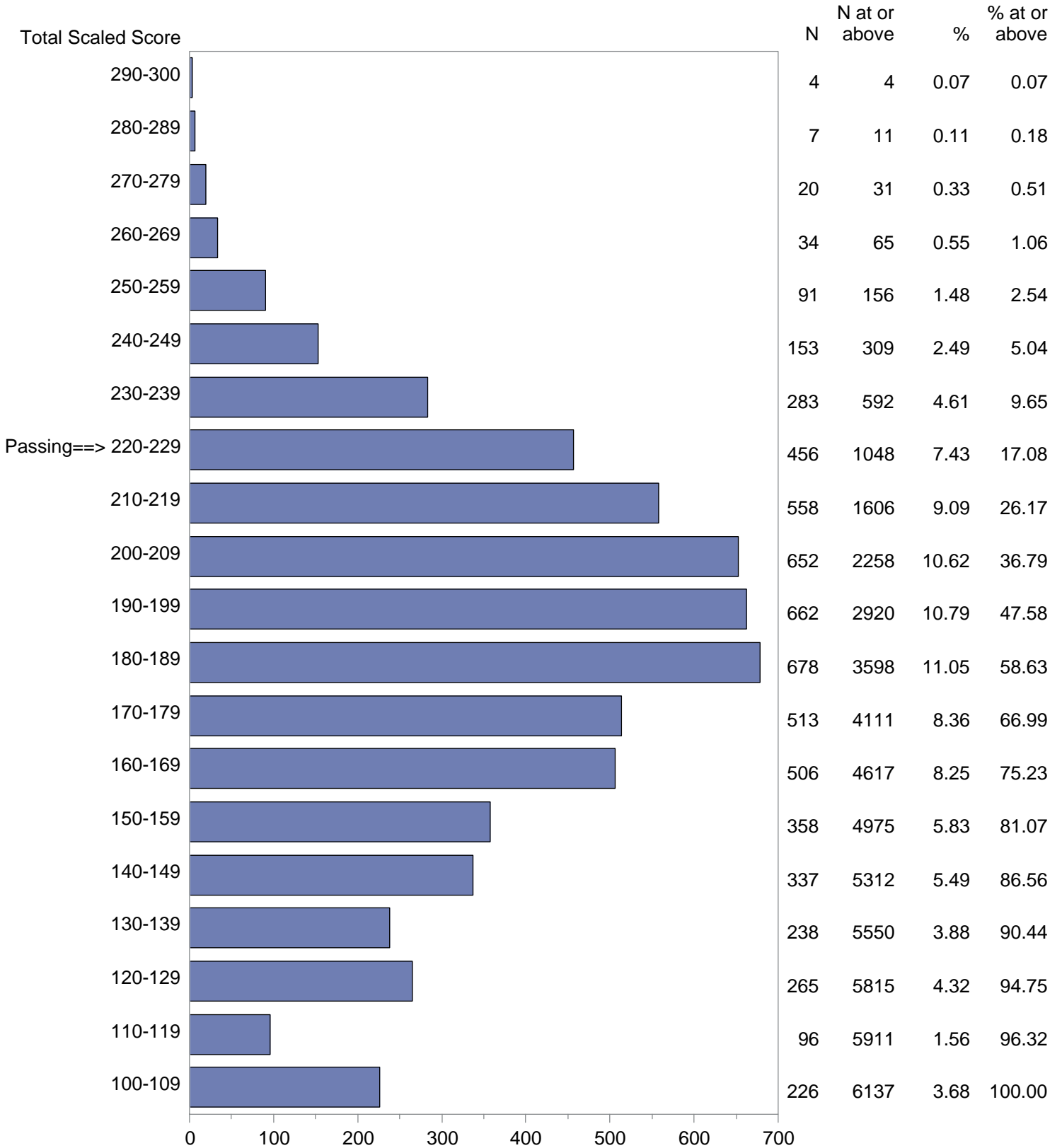
Test Field = Professional Readiness Examination-Mathematics Subtest (296)



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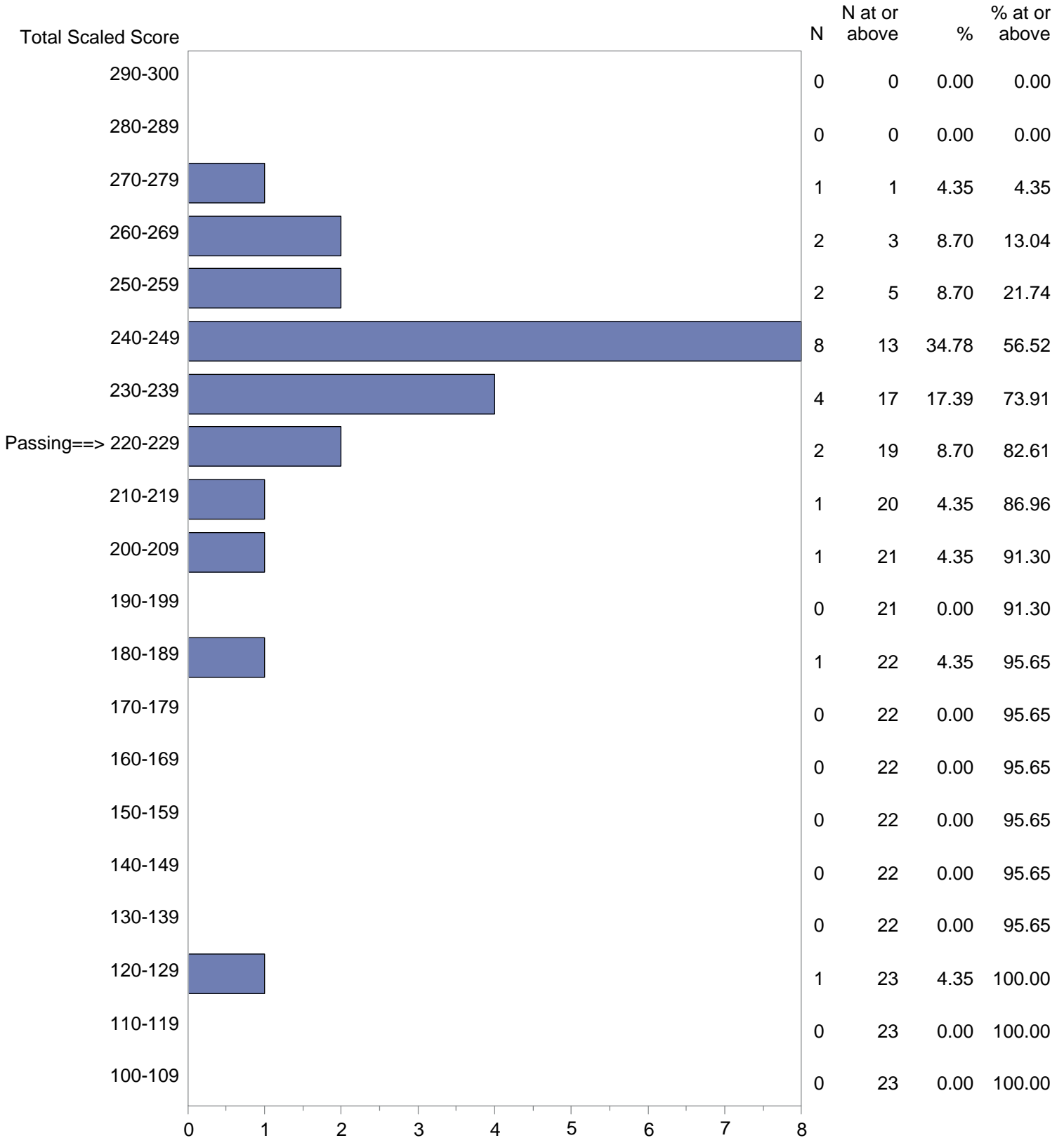
Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)

Test Field = Professional Readiness Examination-Writing Subtest (396)



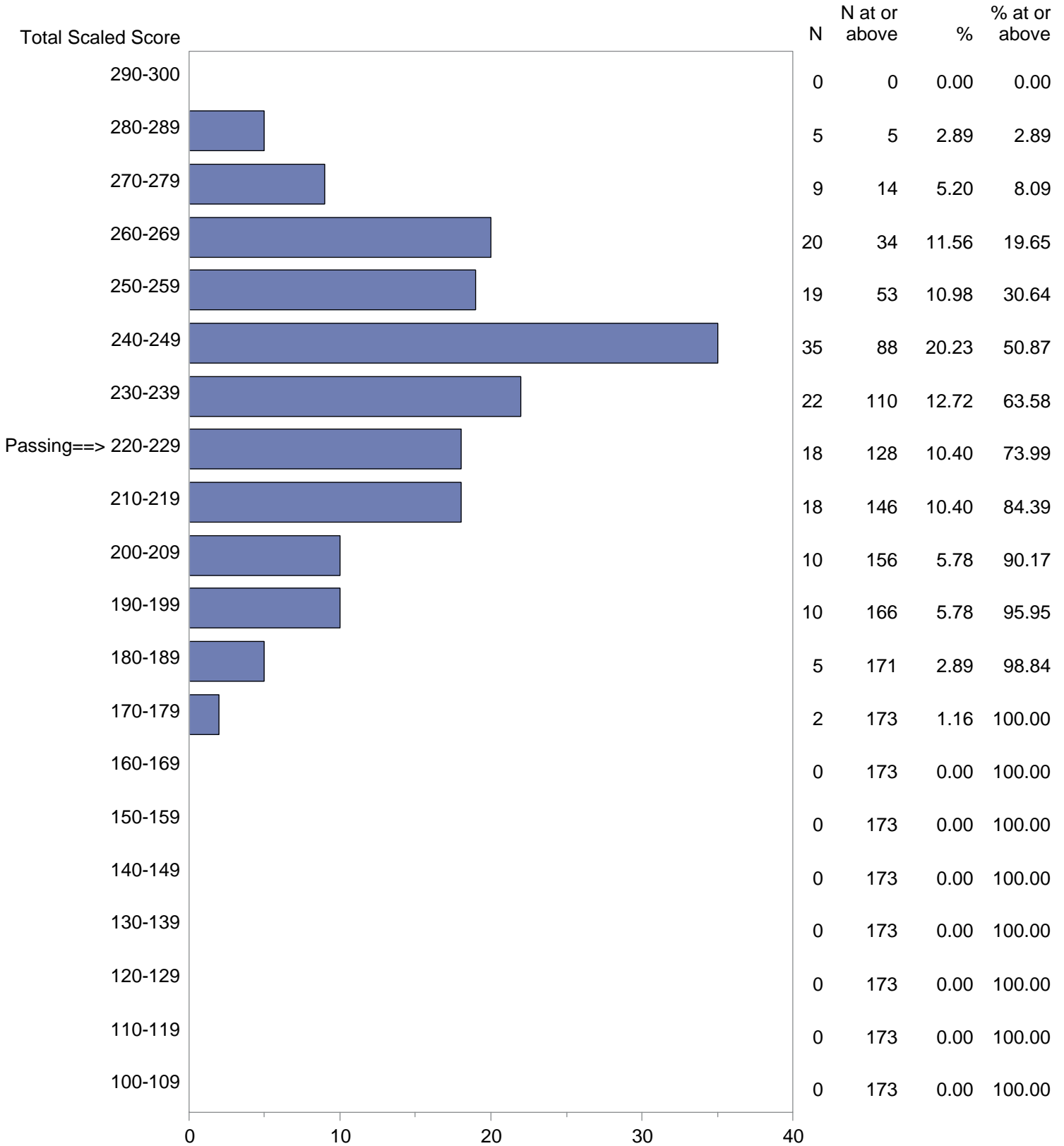
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Arabic (Modern Standard) (102)



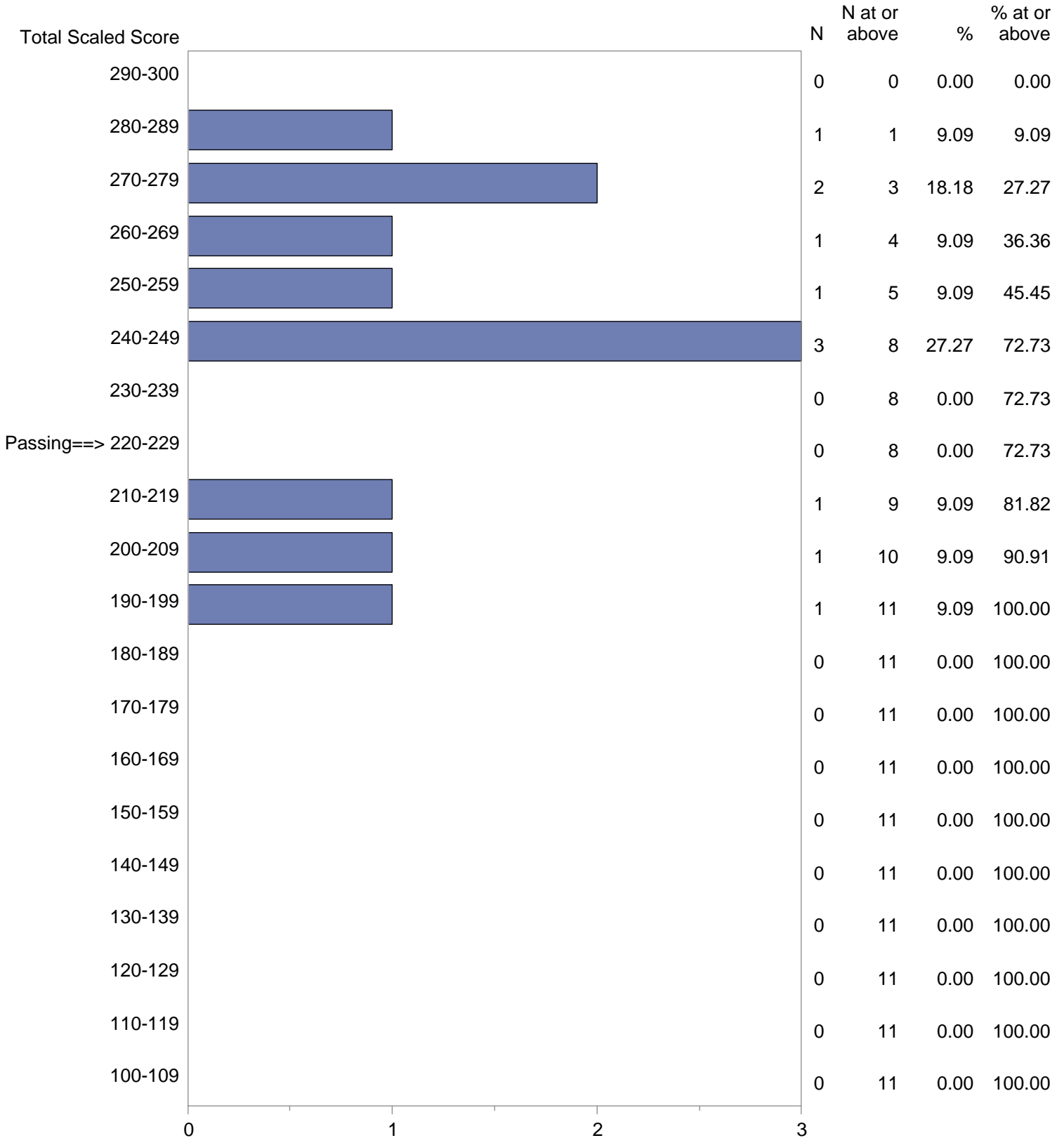
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Autism Spectrum Disorder (064)



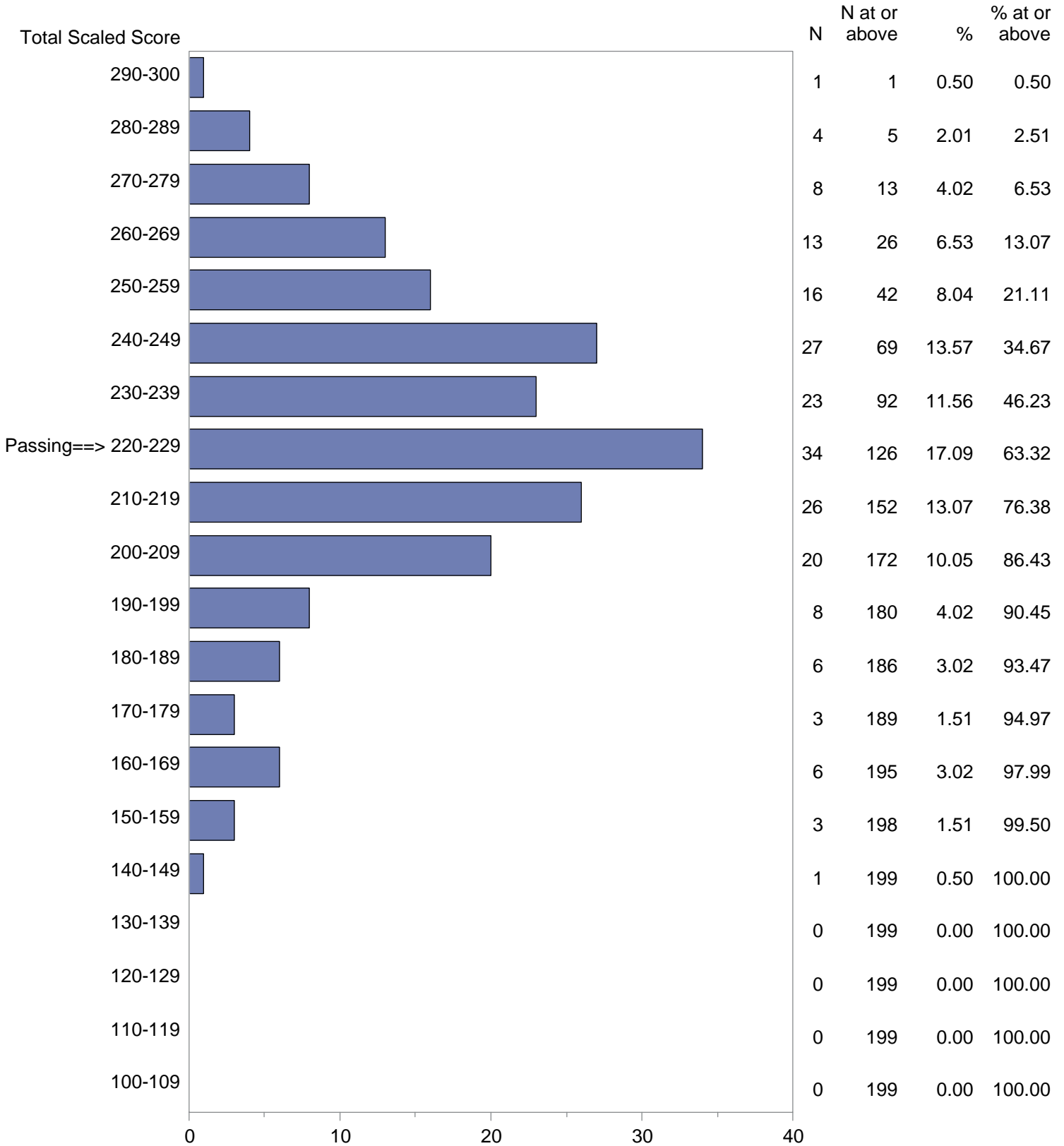
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Bilingual Education (075)



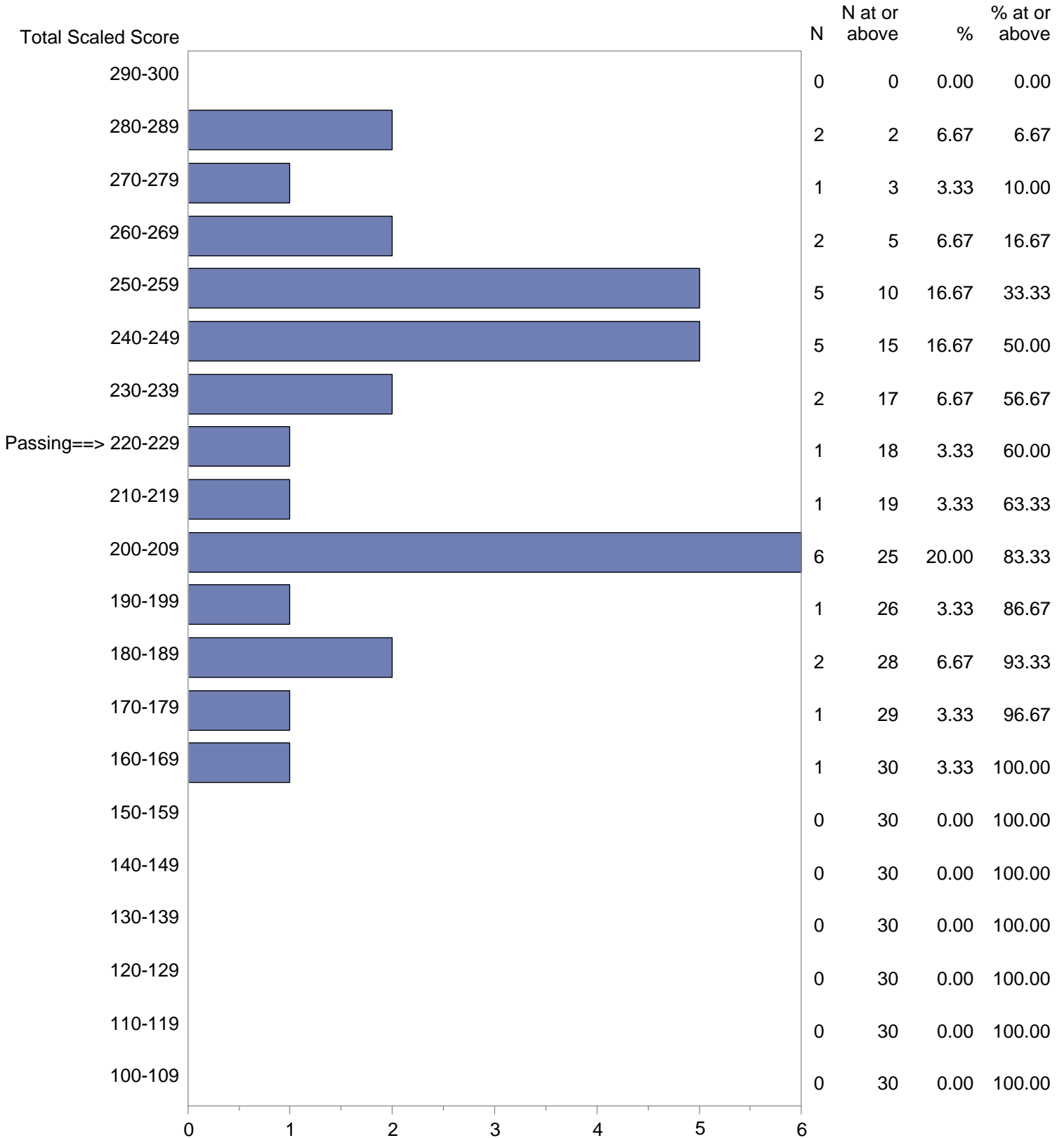
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Biology (017)



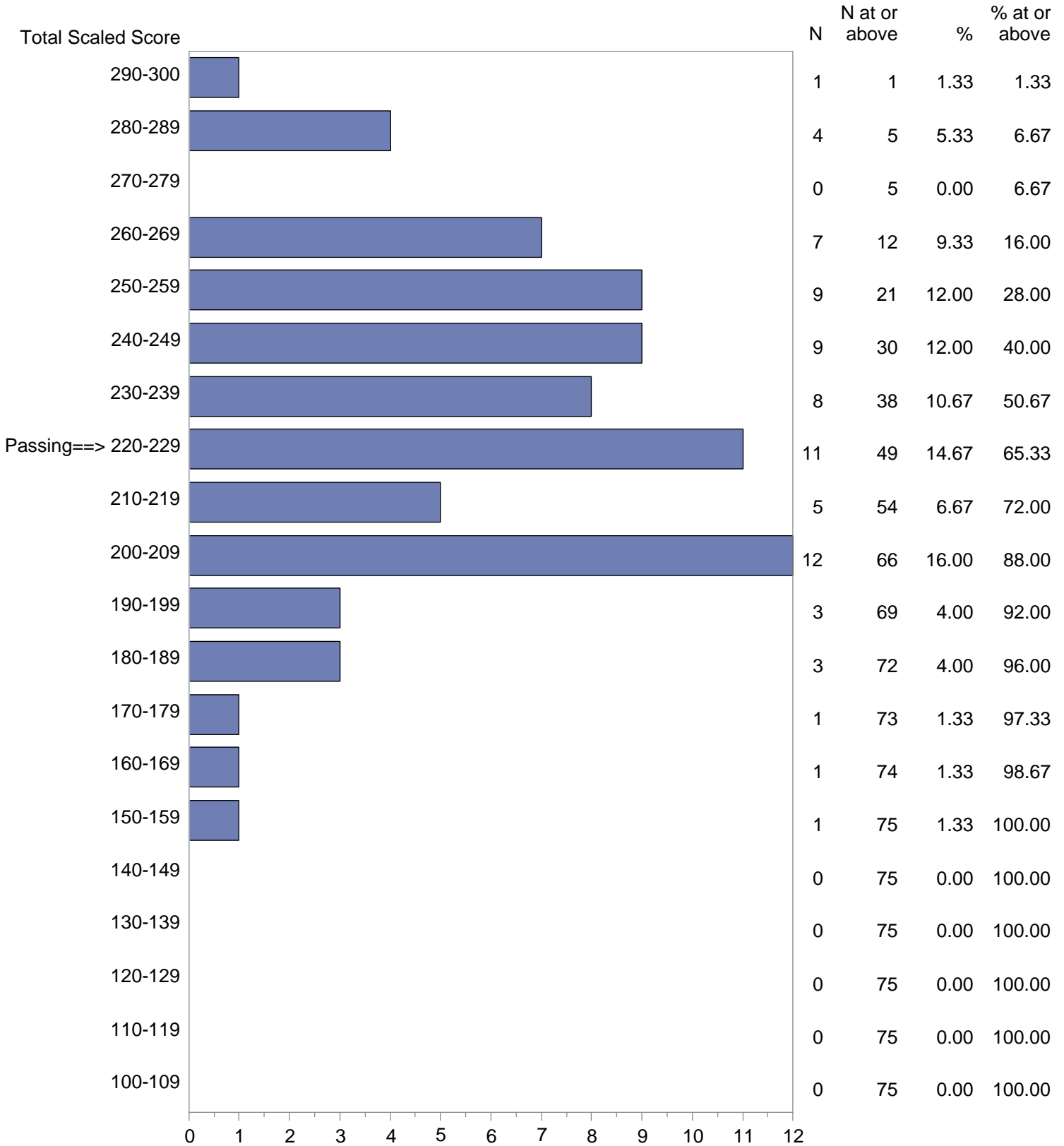
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Business, Management, Marketing, & Tech. (098)



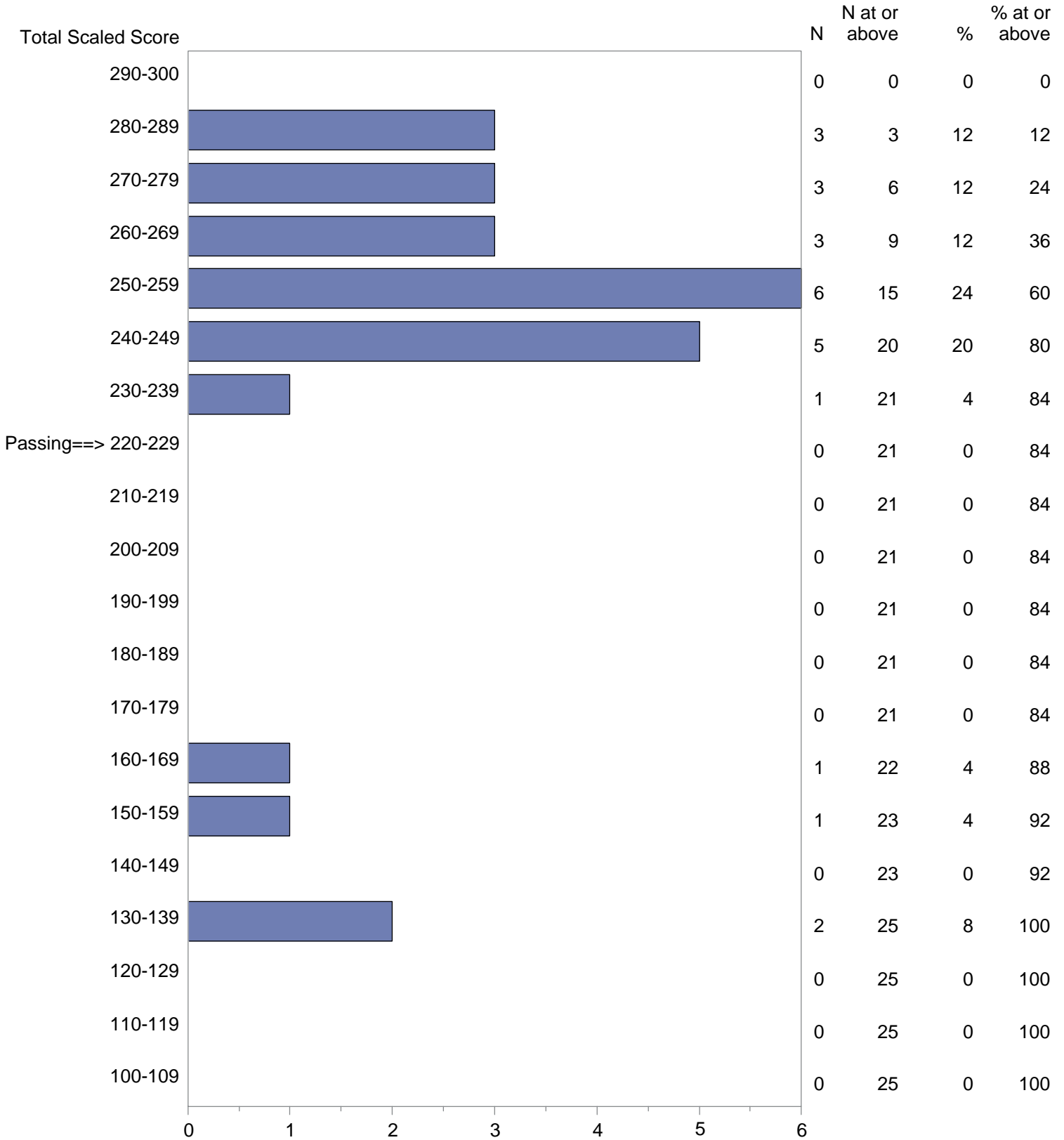
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Chemistry (018)



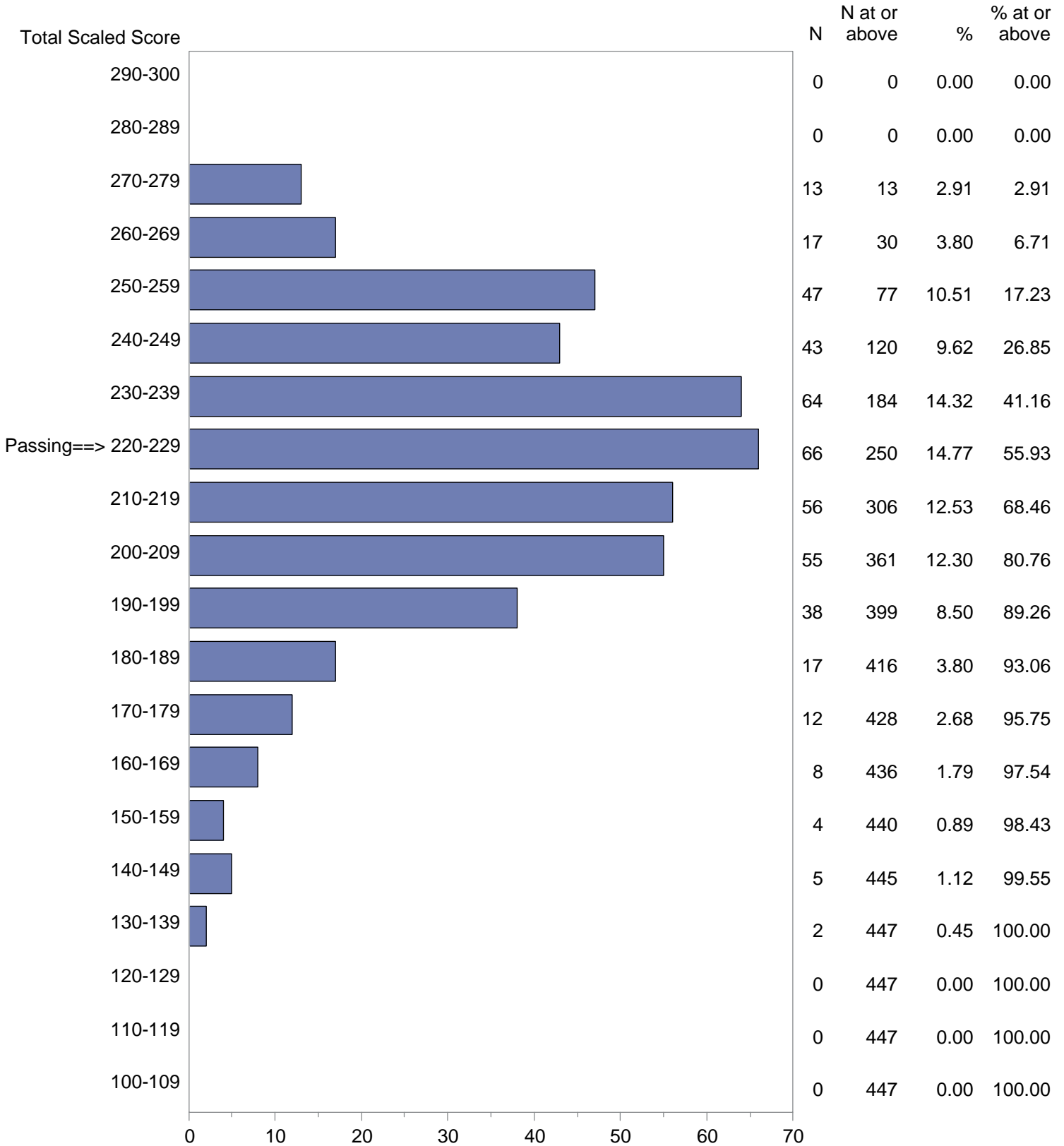
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Chinese (Mandarin) (101)



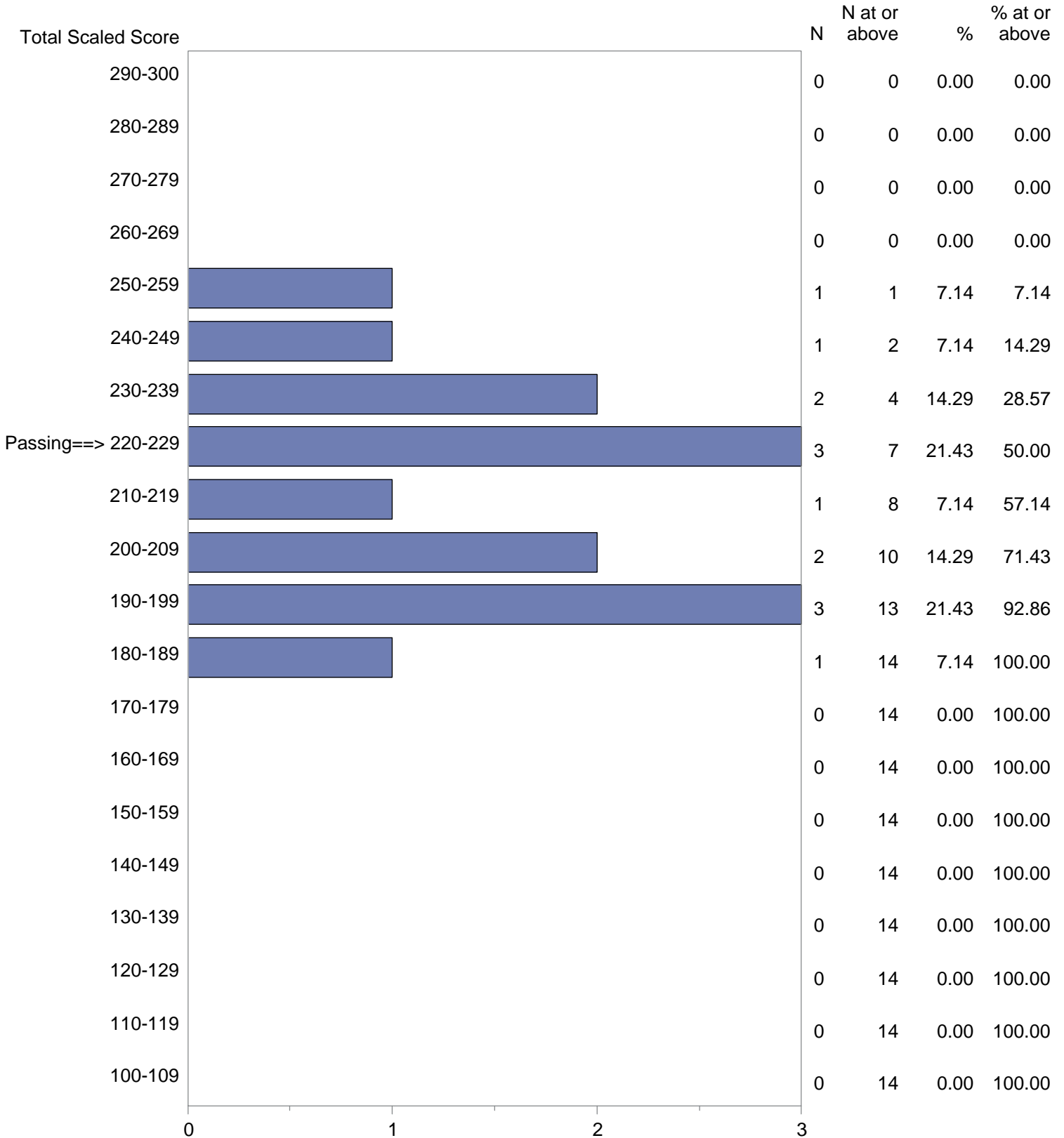
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Cognitive Impairment (056)



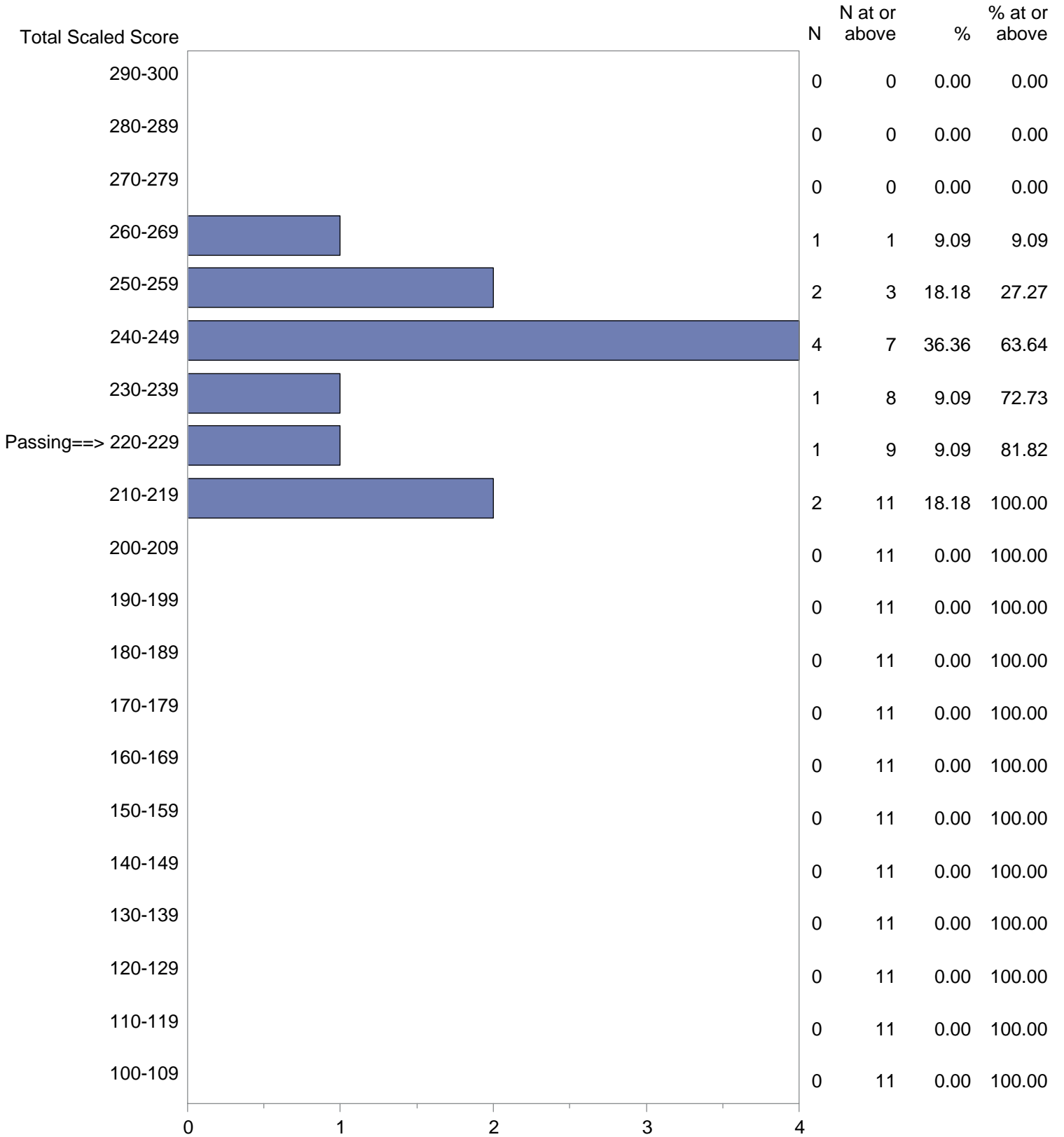
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Communication Arts (Secondary) (091)



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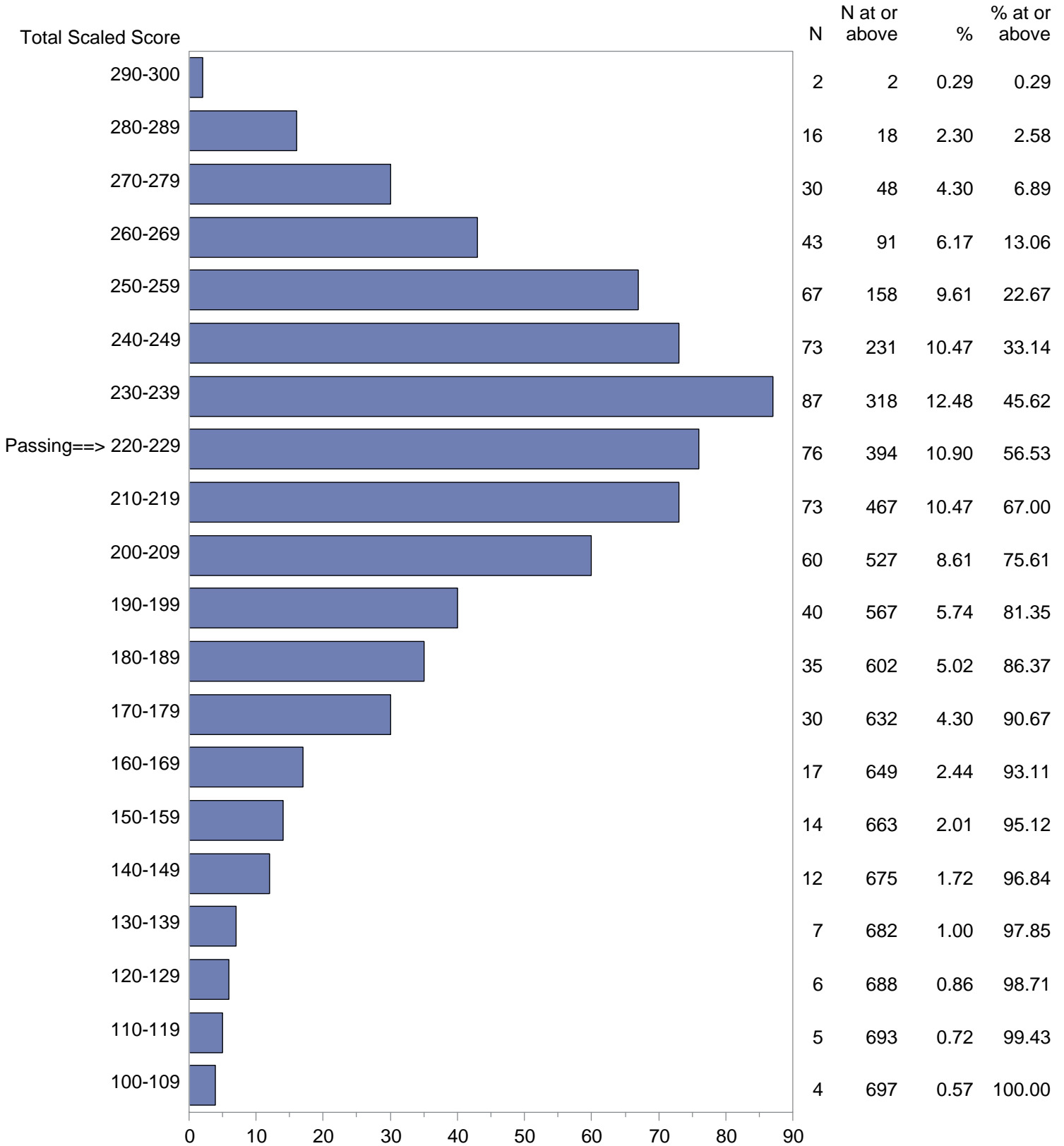
Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Dance (046)



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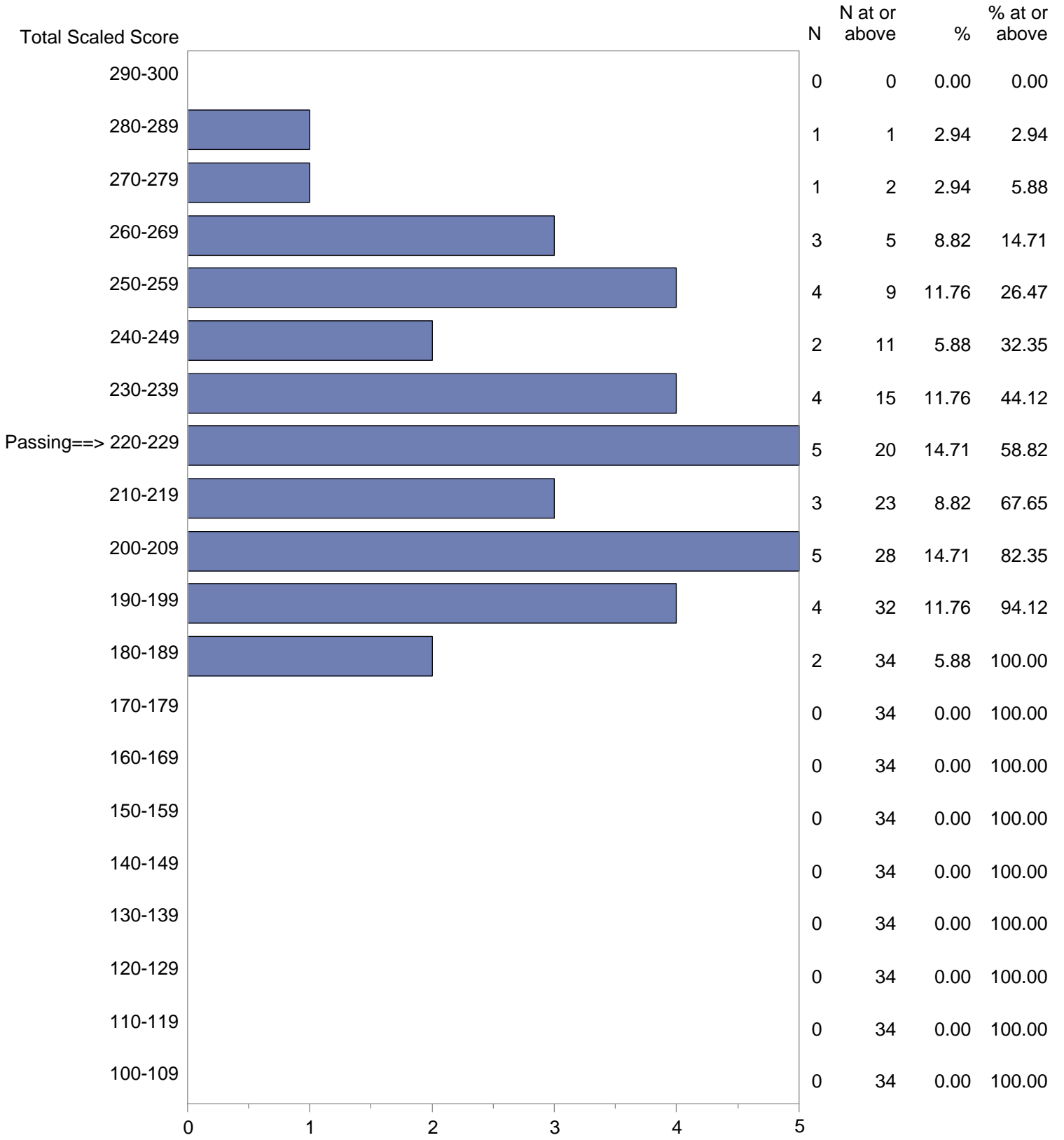
Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)

Test Field = Early Childhood Education (General and Special Education) (106)



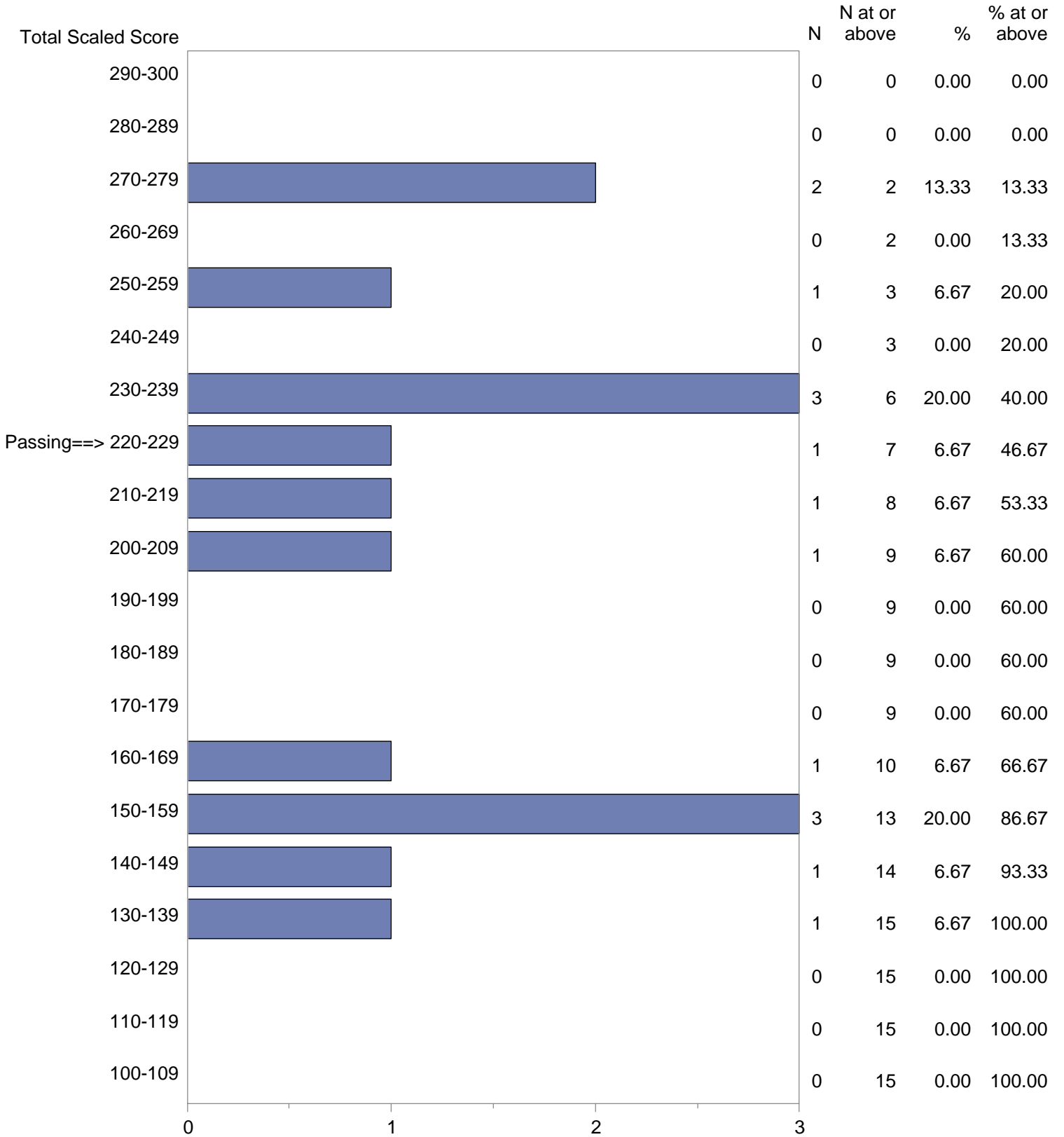
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Earth/Space Science (020)



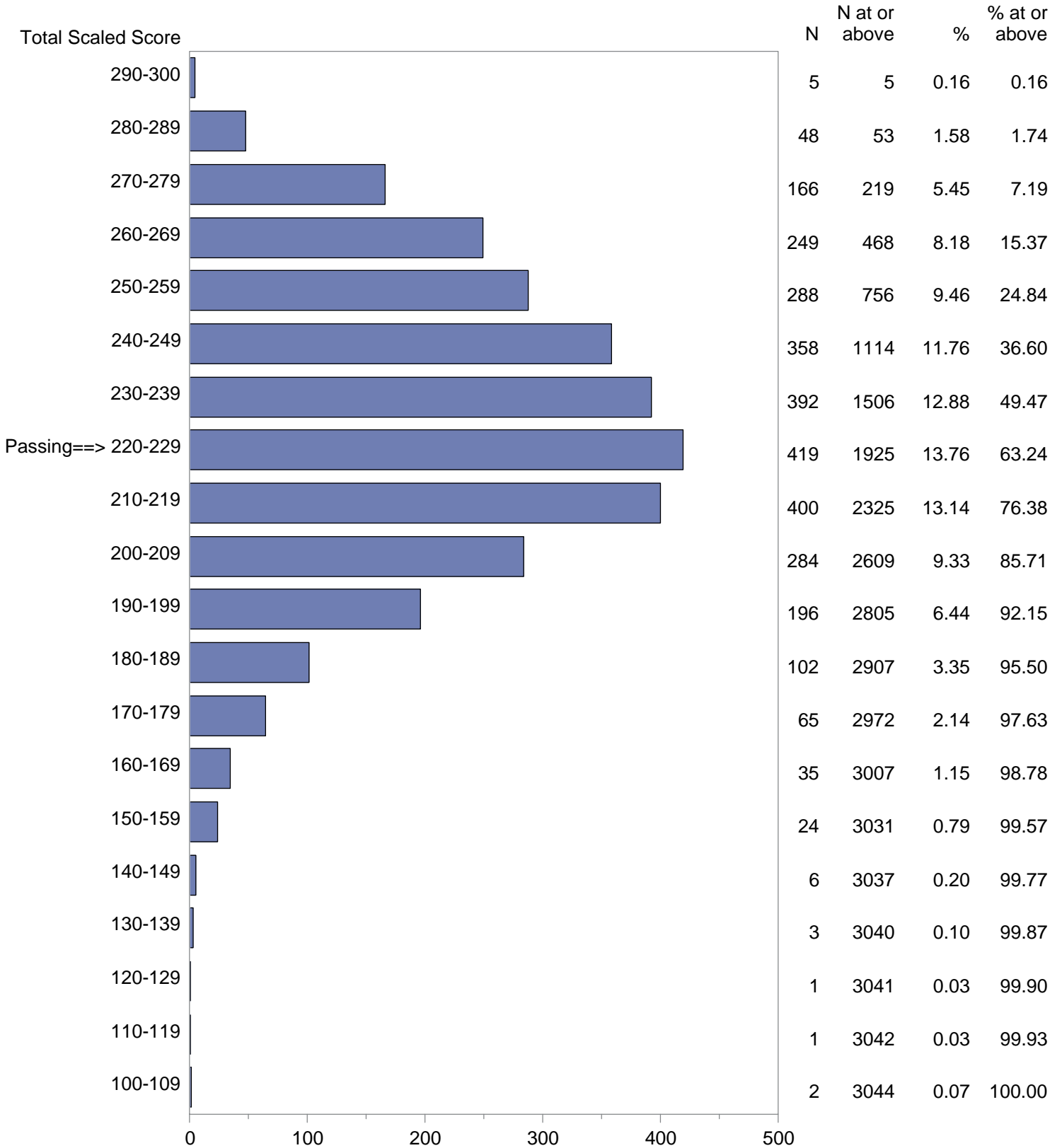
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Economics (007)



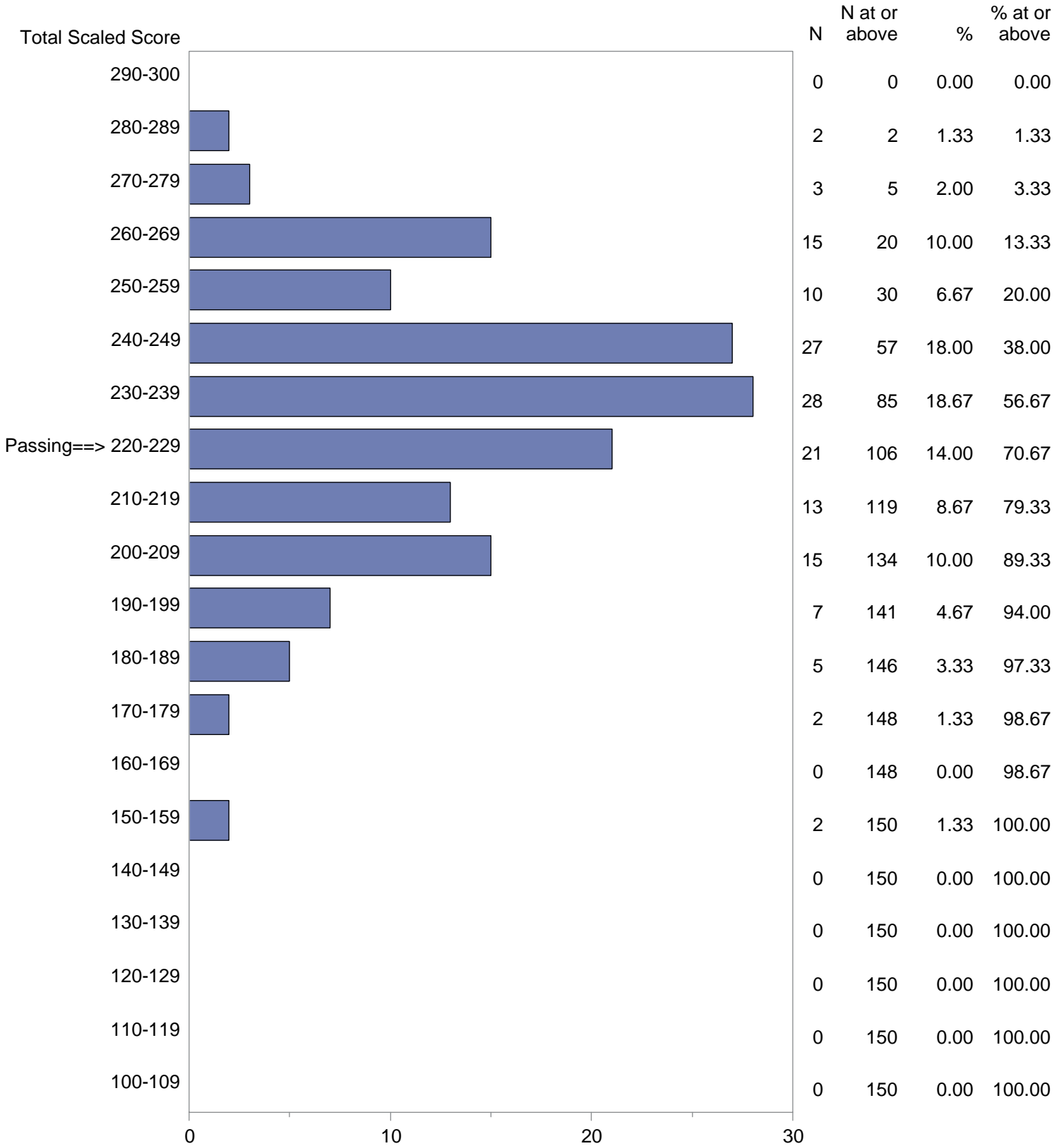
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Elementary Education (103)



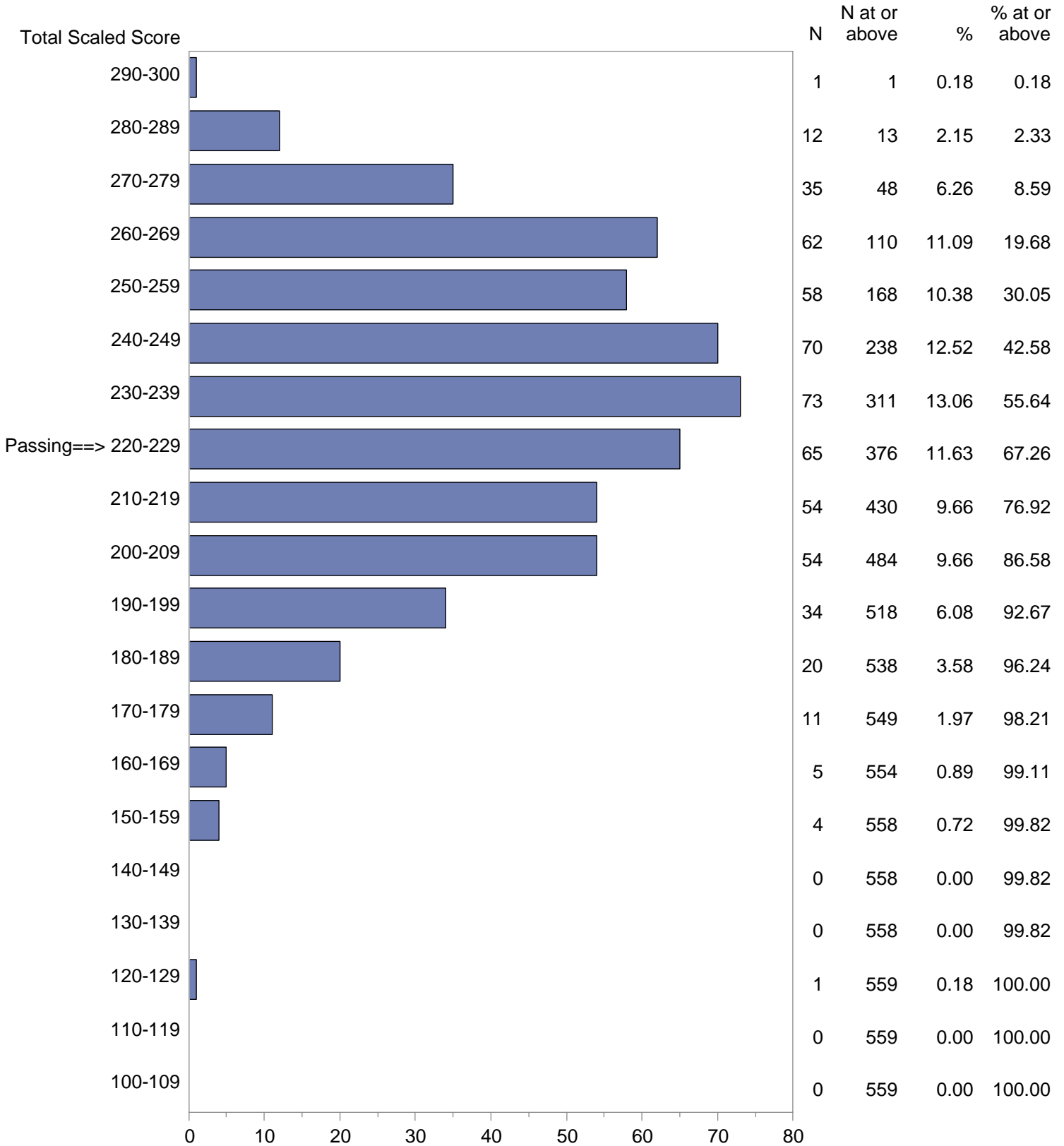
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Emotional Impairment (059)



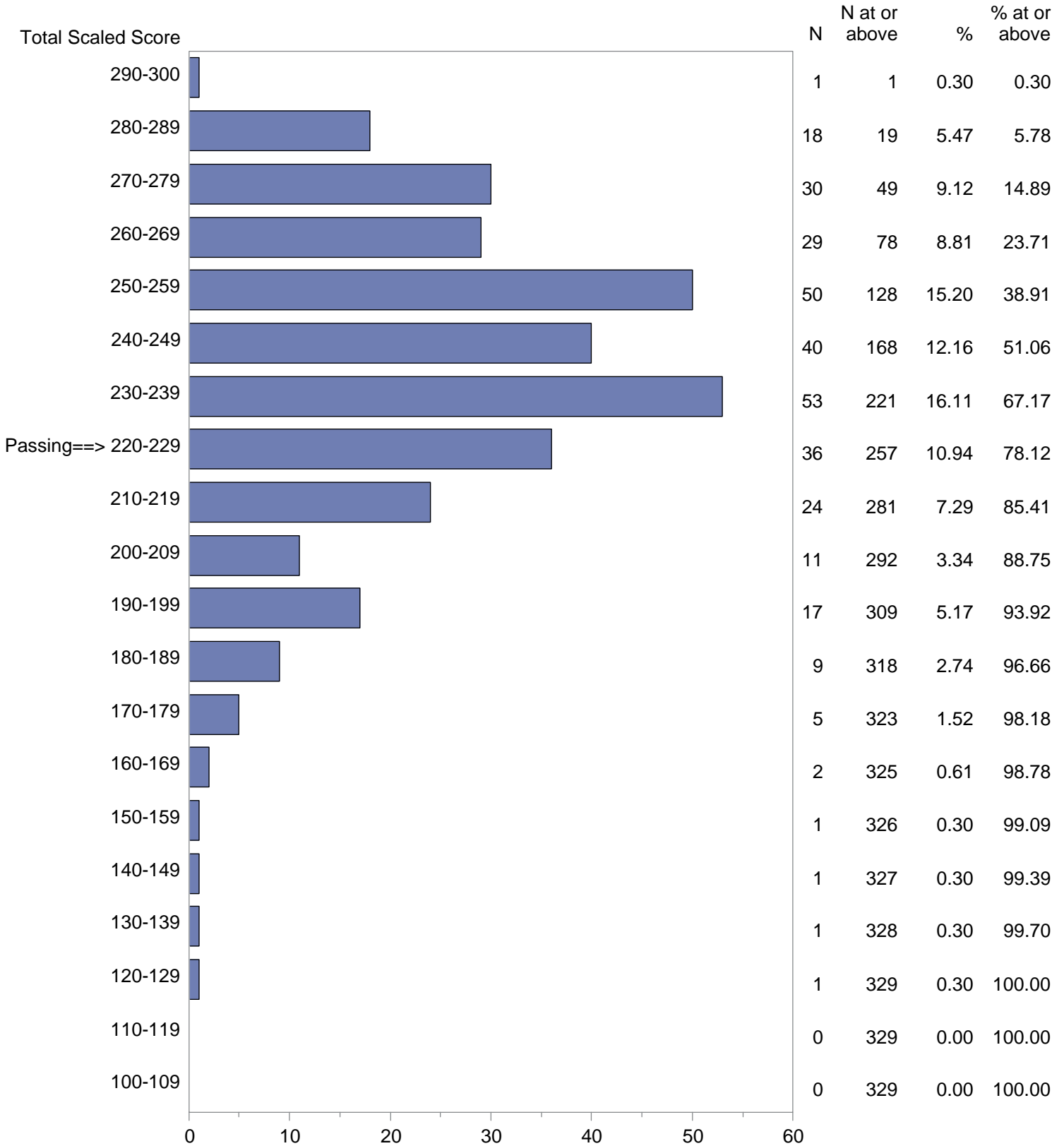
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = English (002)



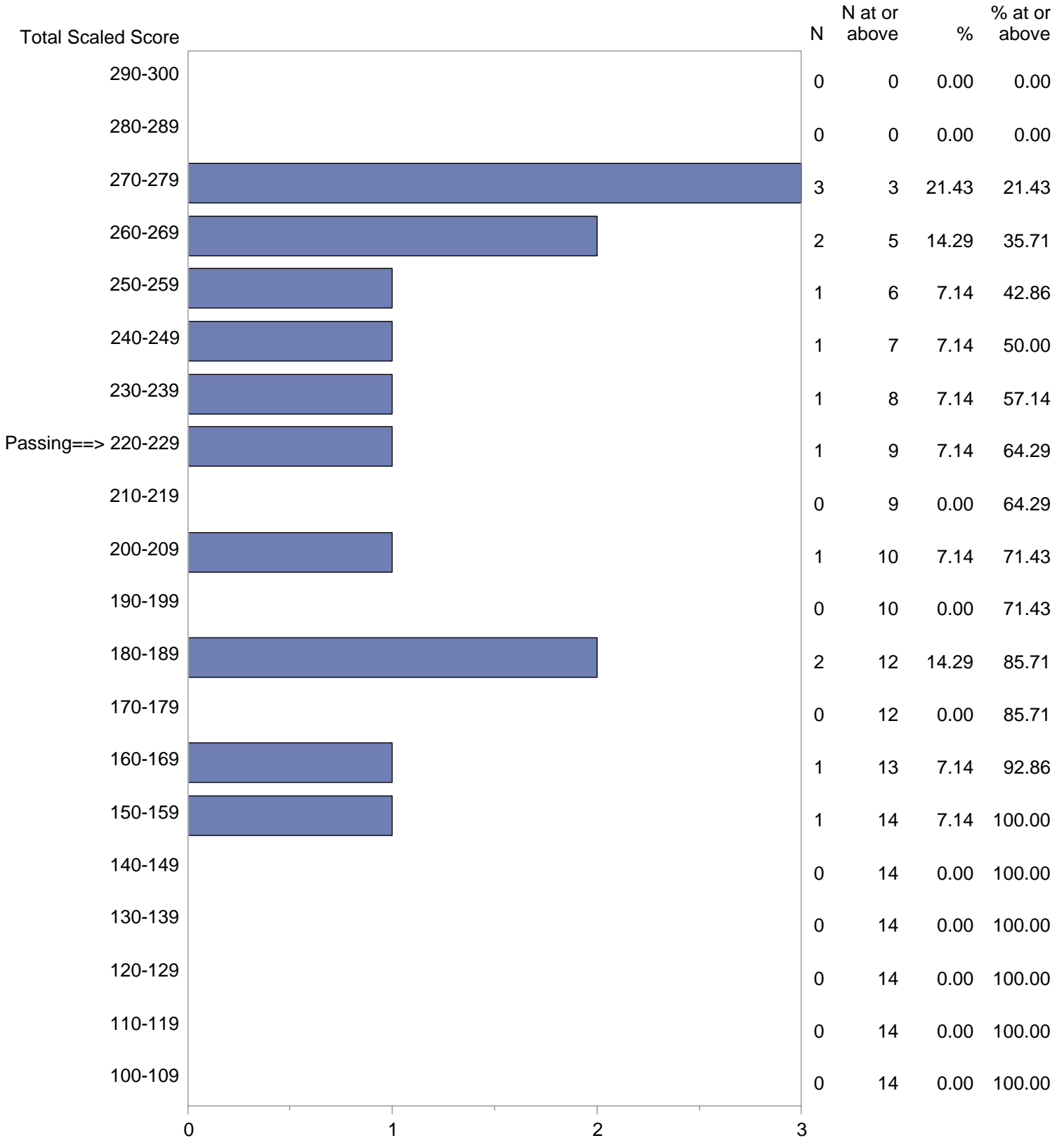
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = English as a Second Language (086)



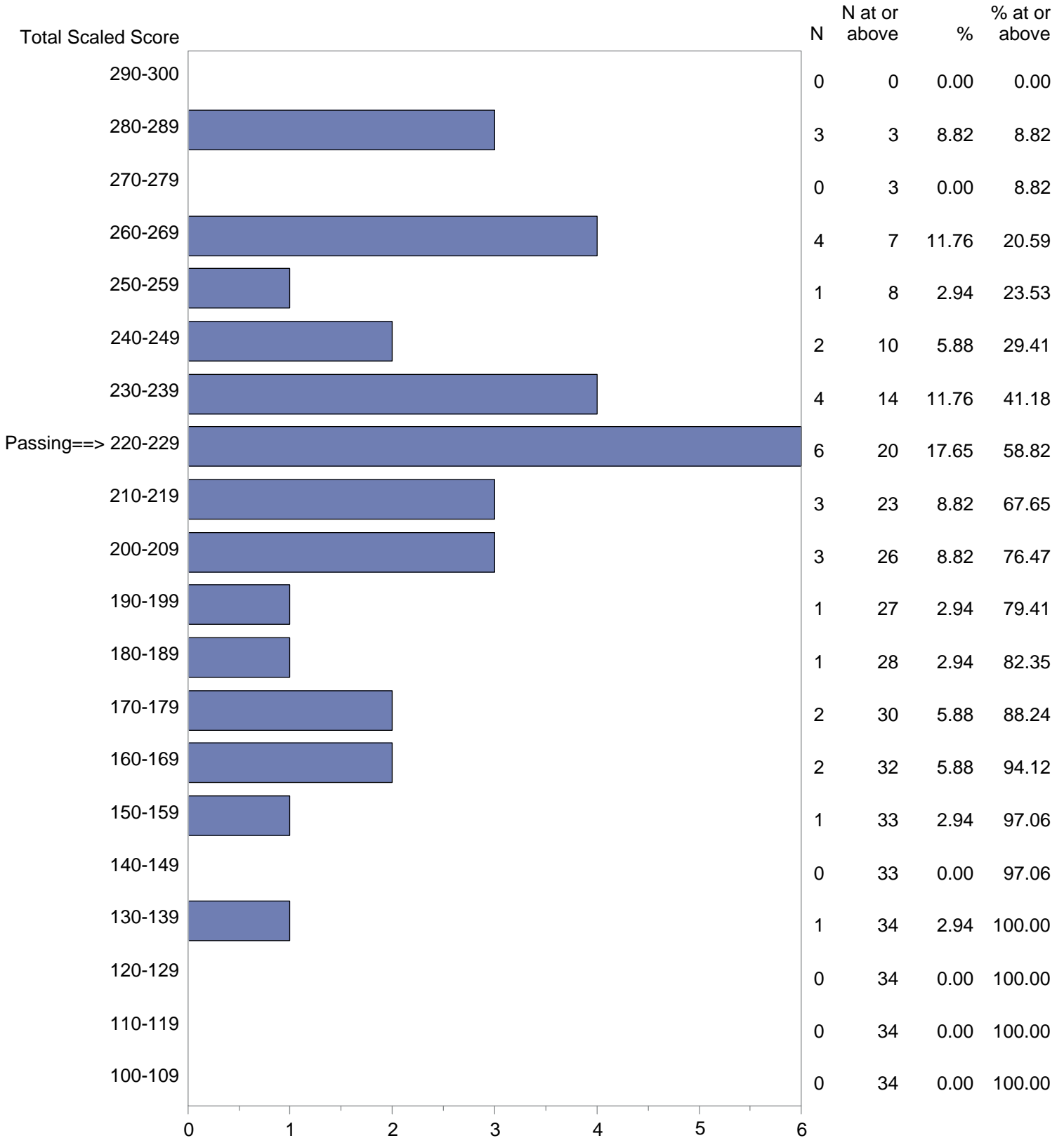
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Family and Consumer Sciences (040)



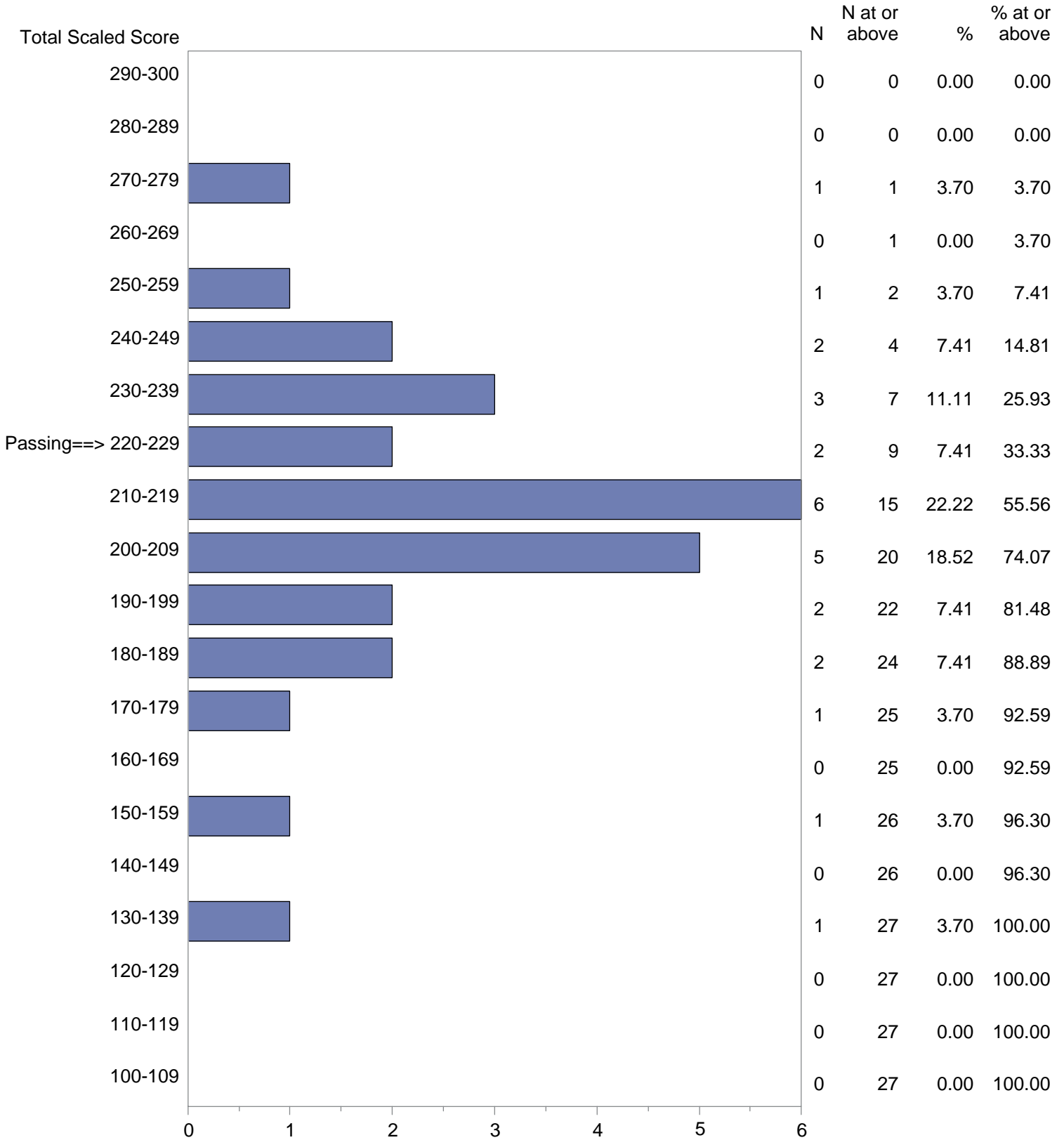
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = French (023)



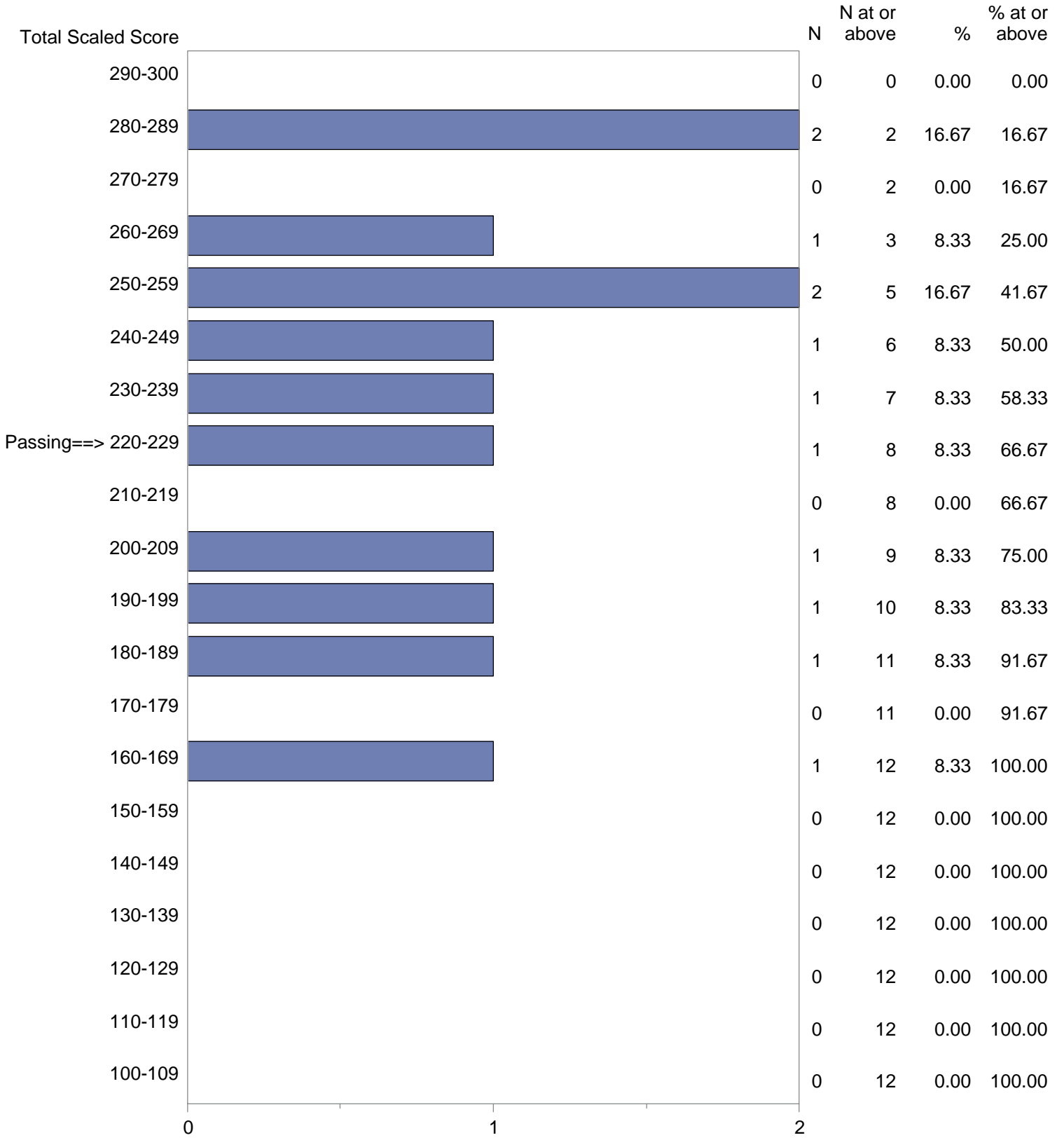
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Geography (008)



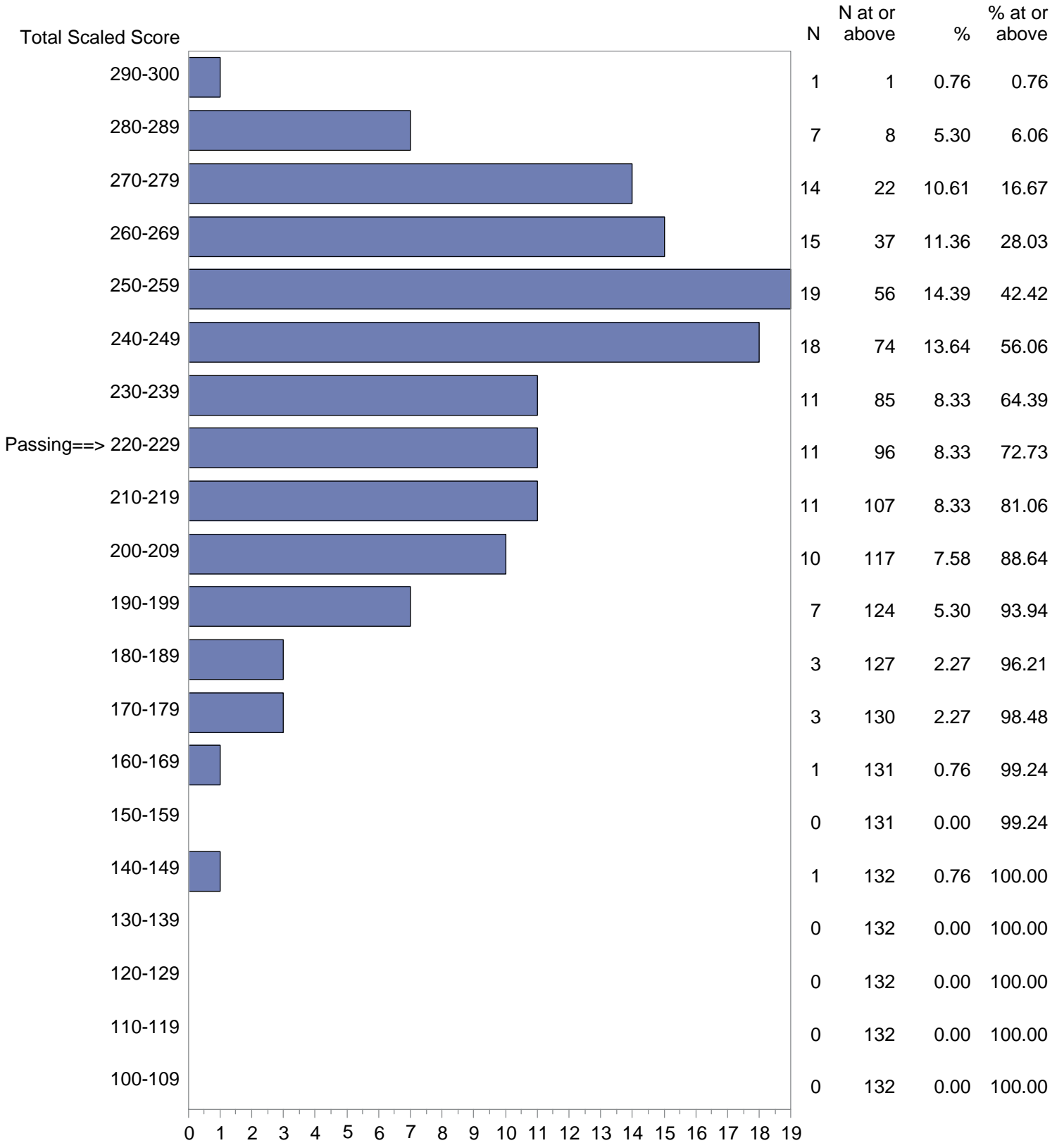
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = German (024)



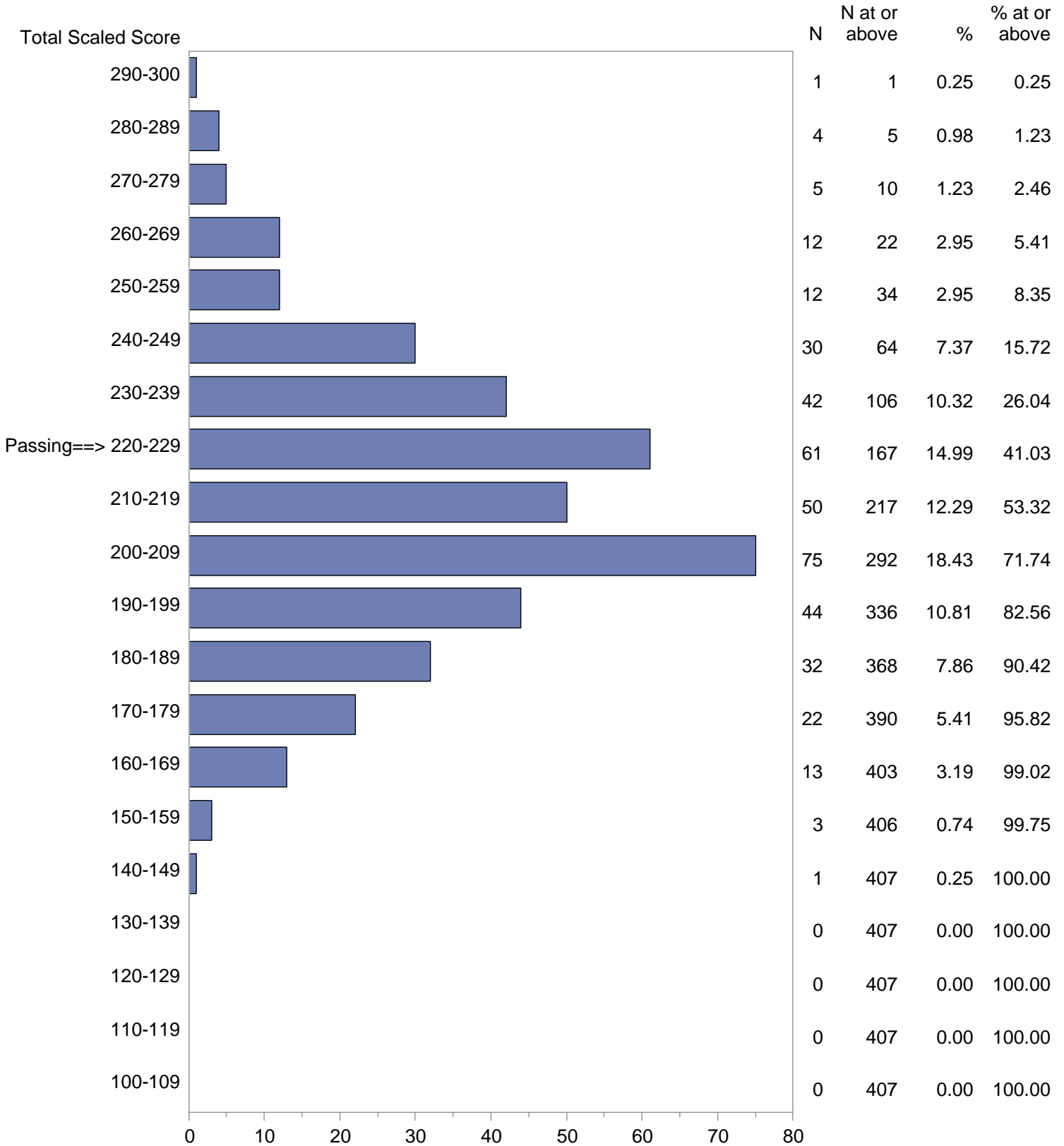
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Health (043)



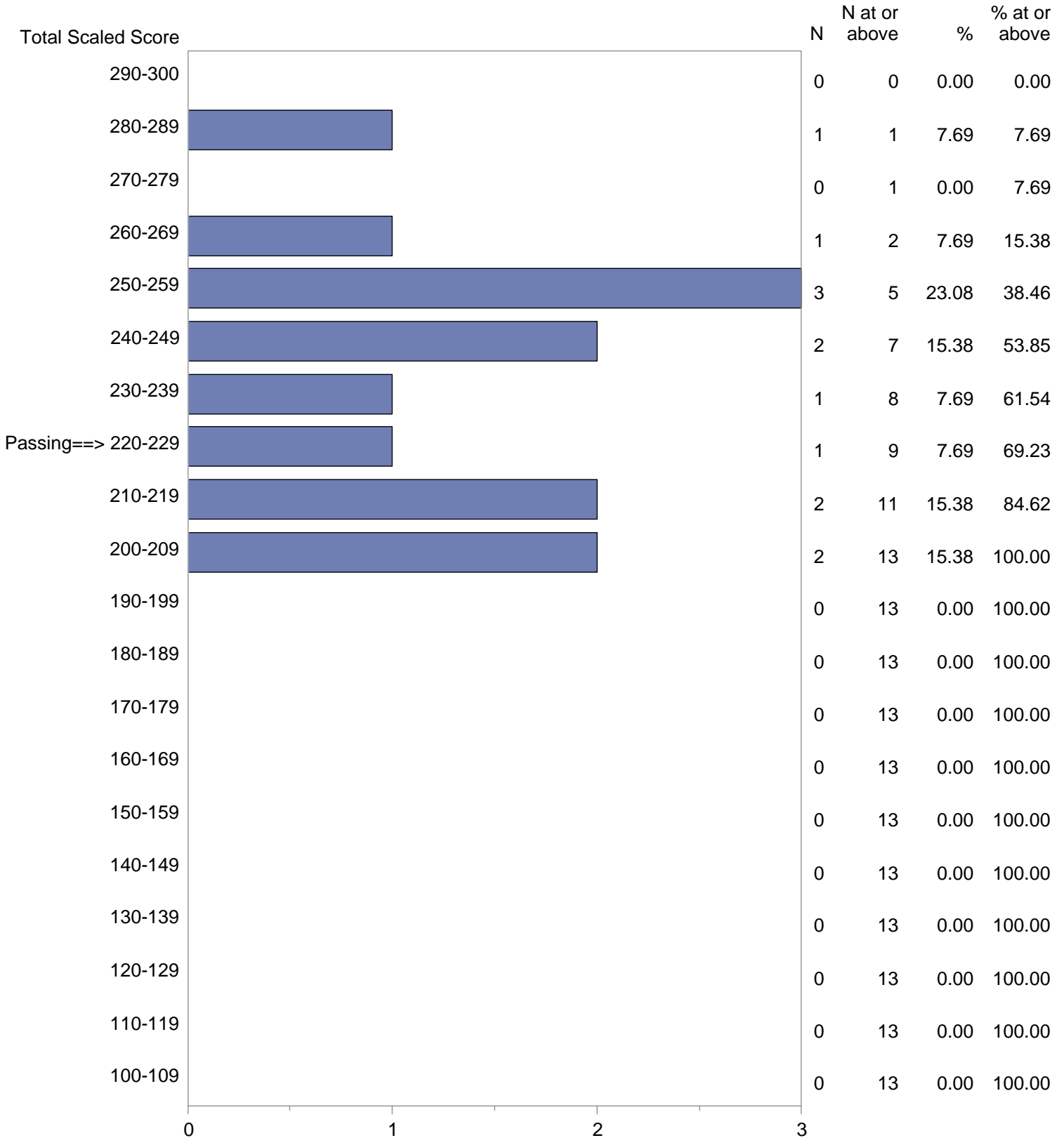
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = History (009)



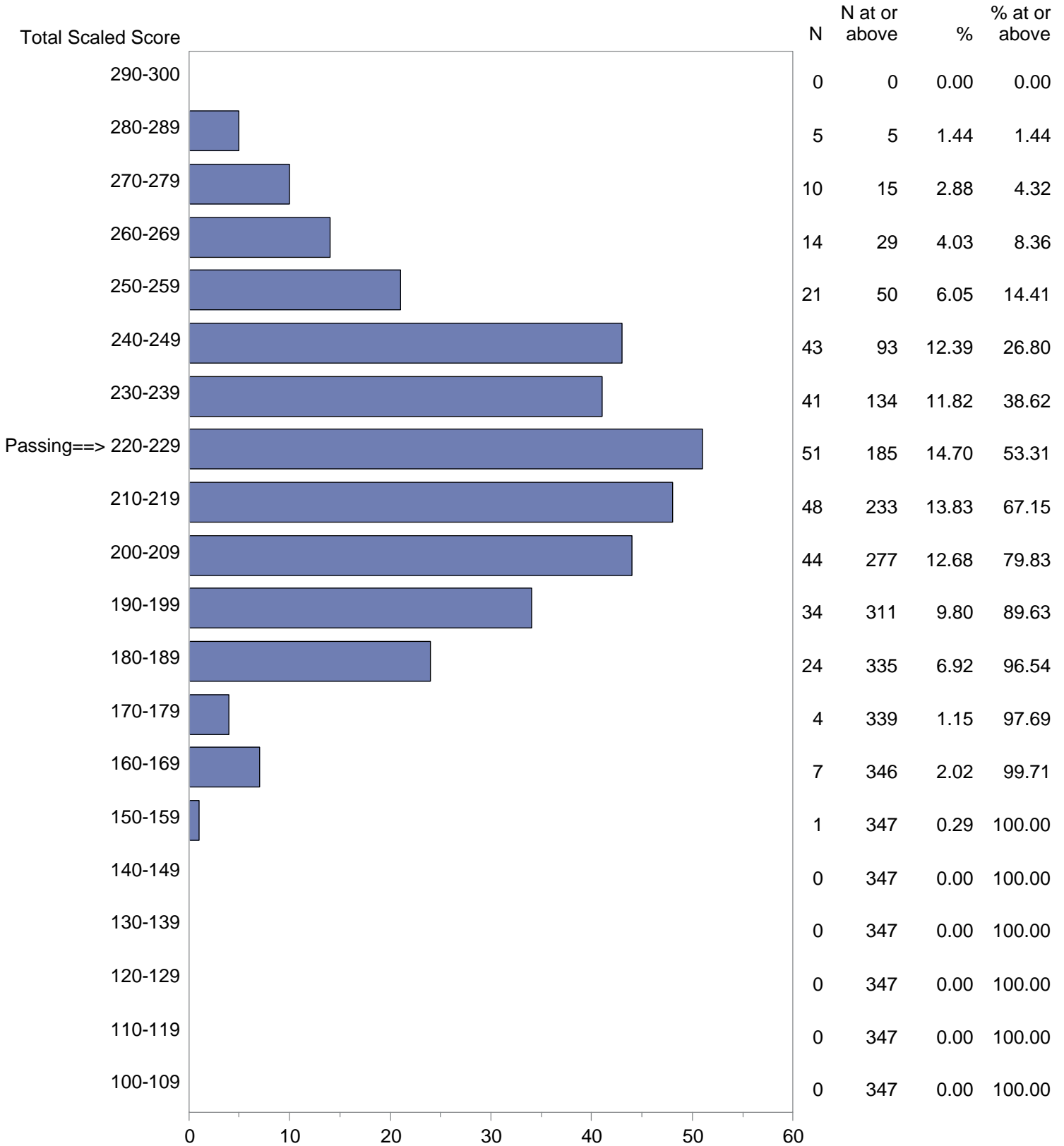
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Industrial Technology (087)



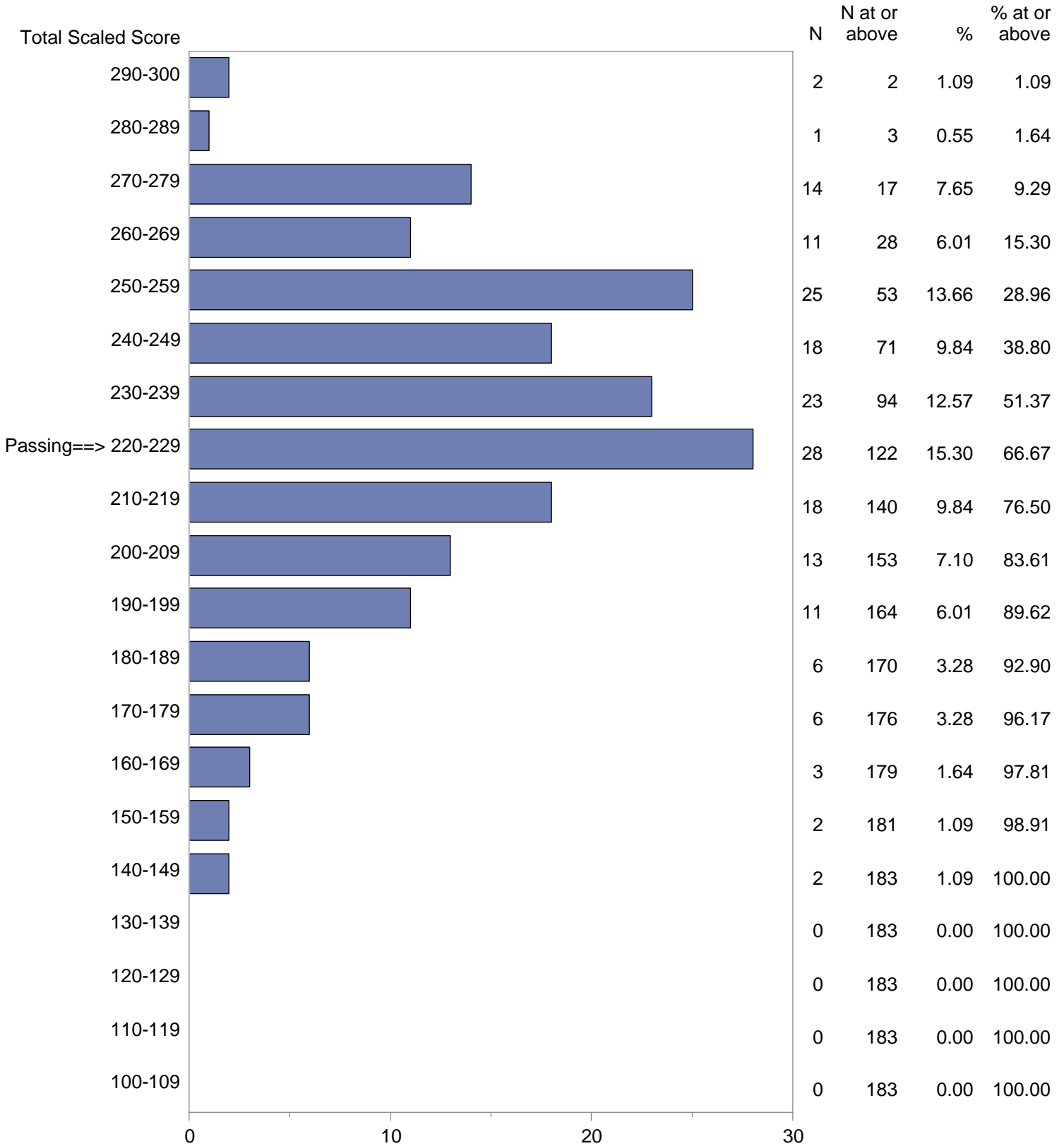
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Integrated Science (Elementary) (093)



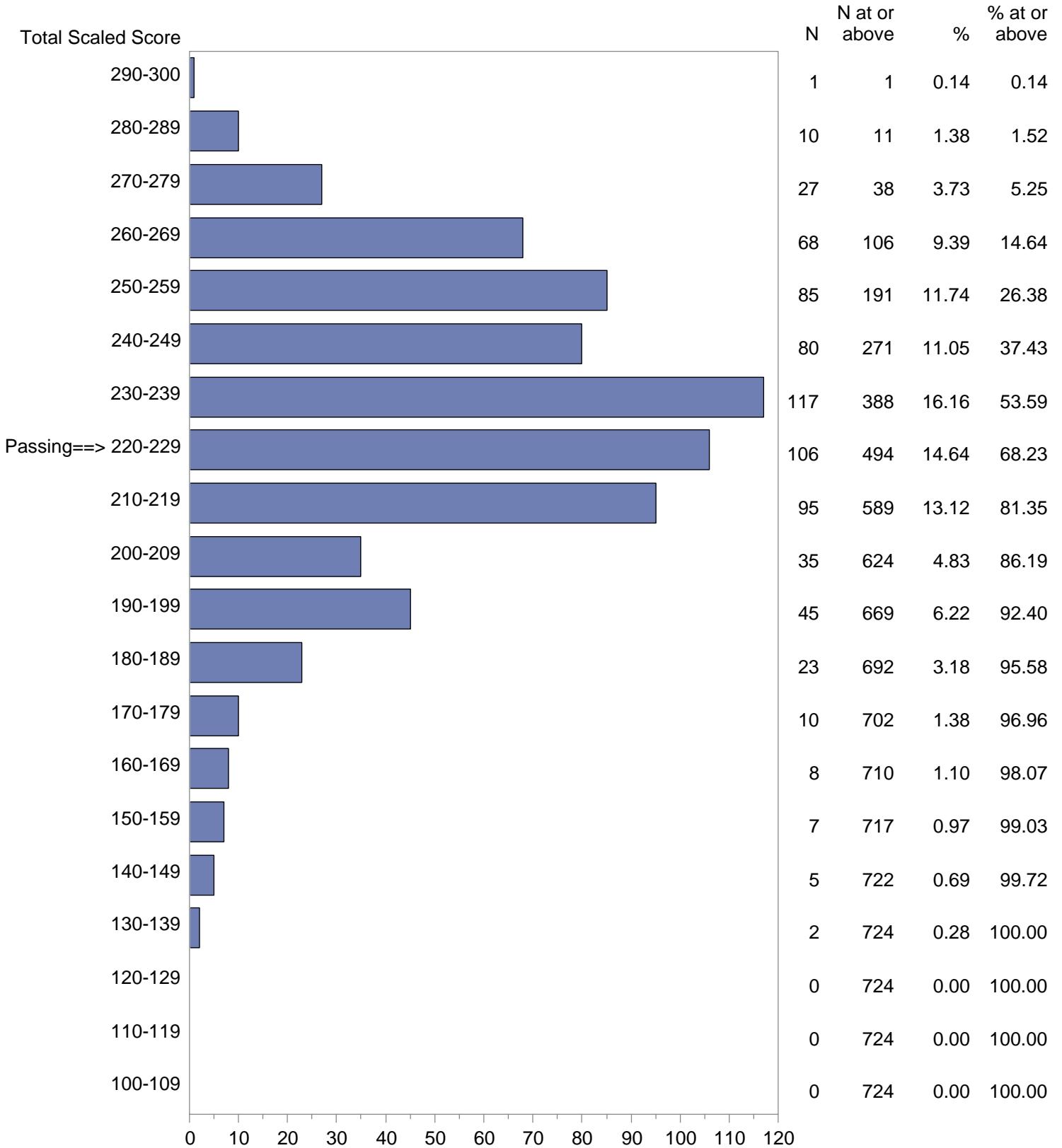
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Integrated Science (Secondary) (094)



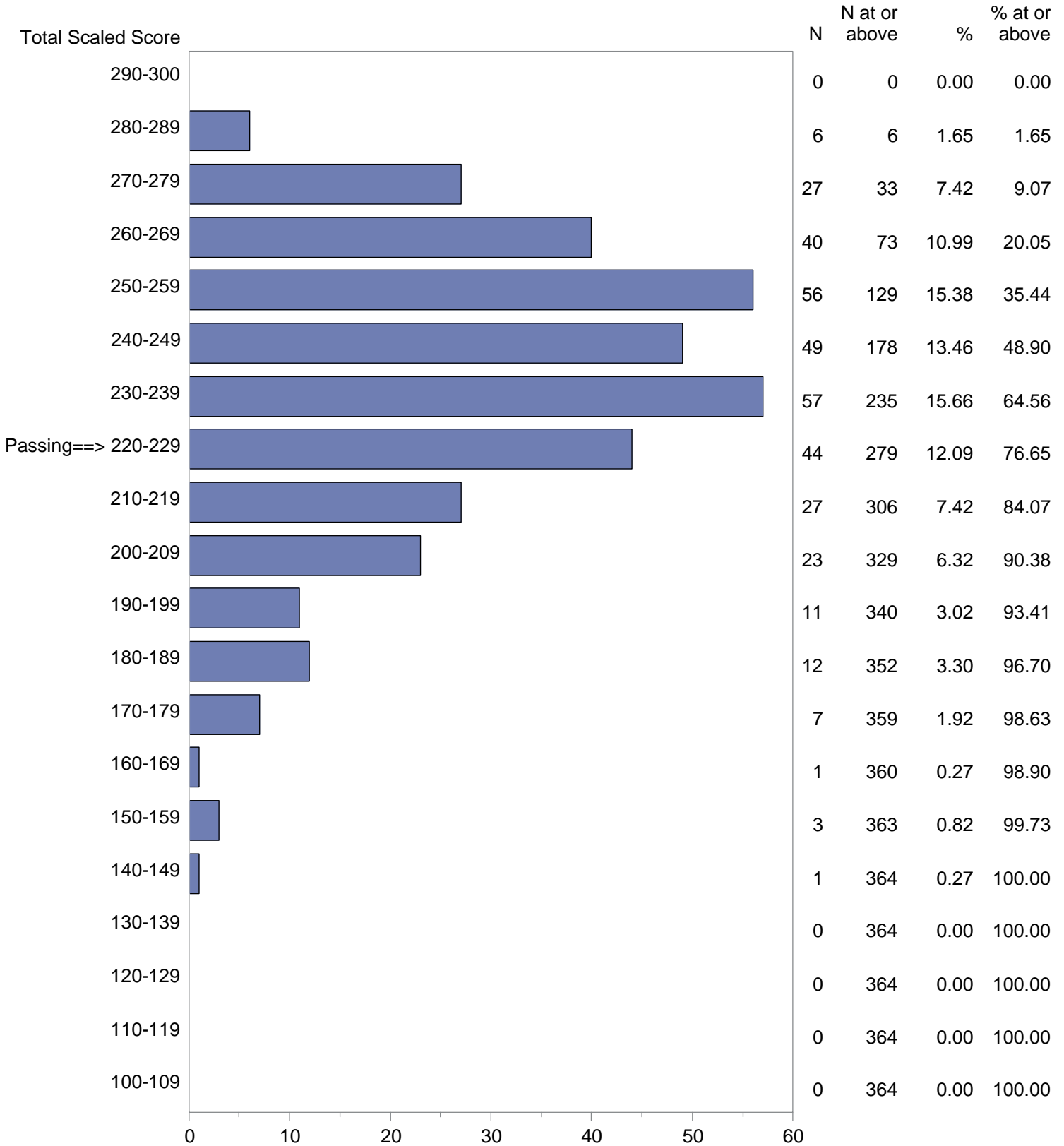
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Language Arts (Elementary) (090)



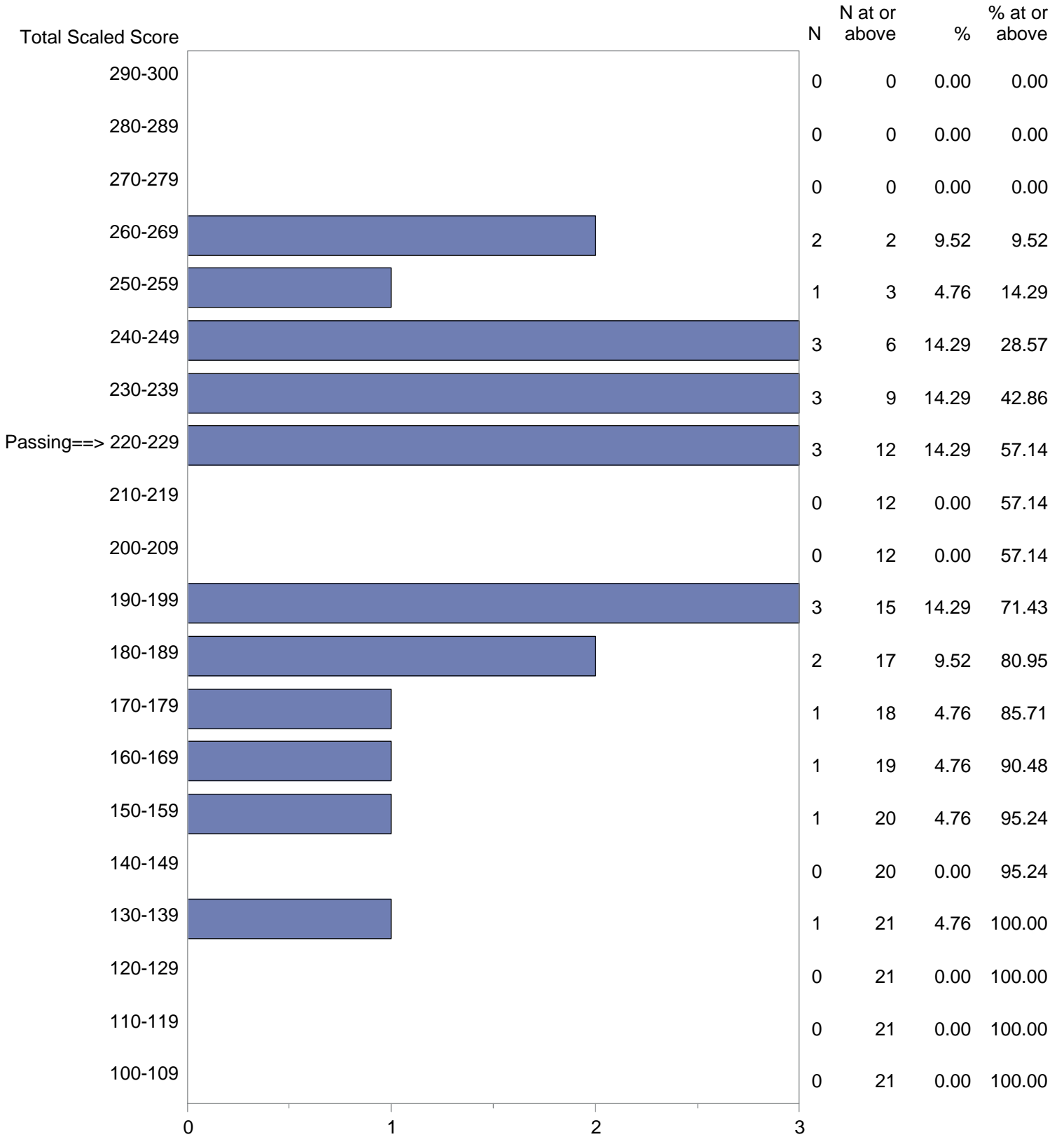
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Learning Disabilities (063)



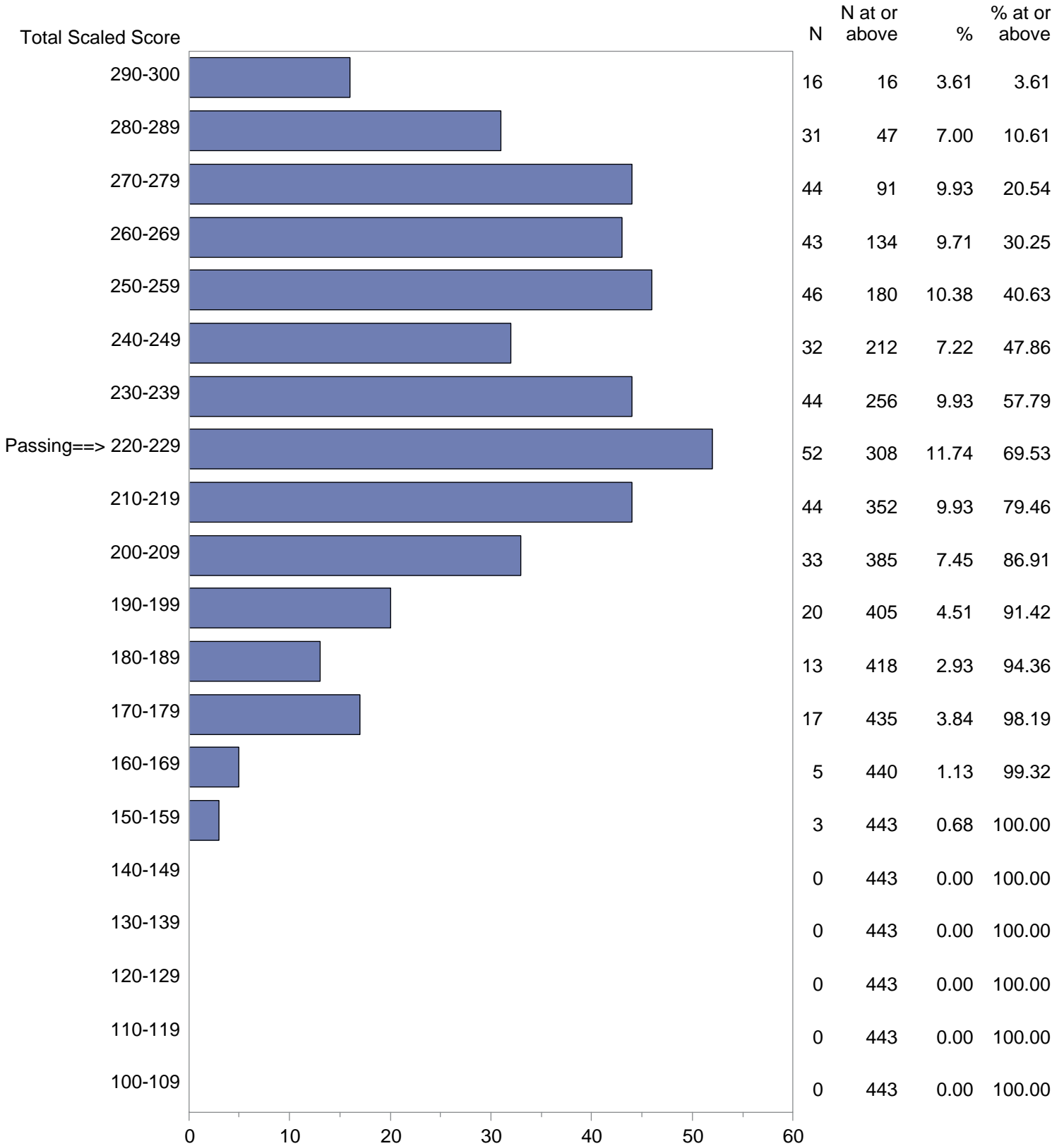
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Library Media (048)



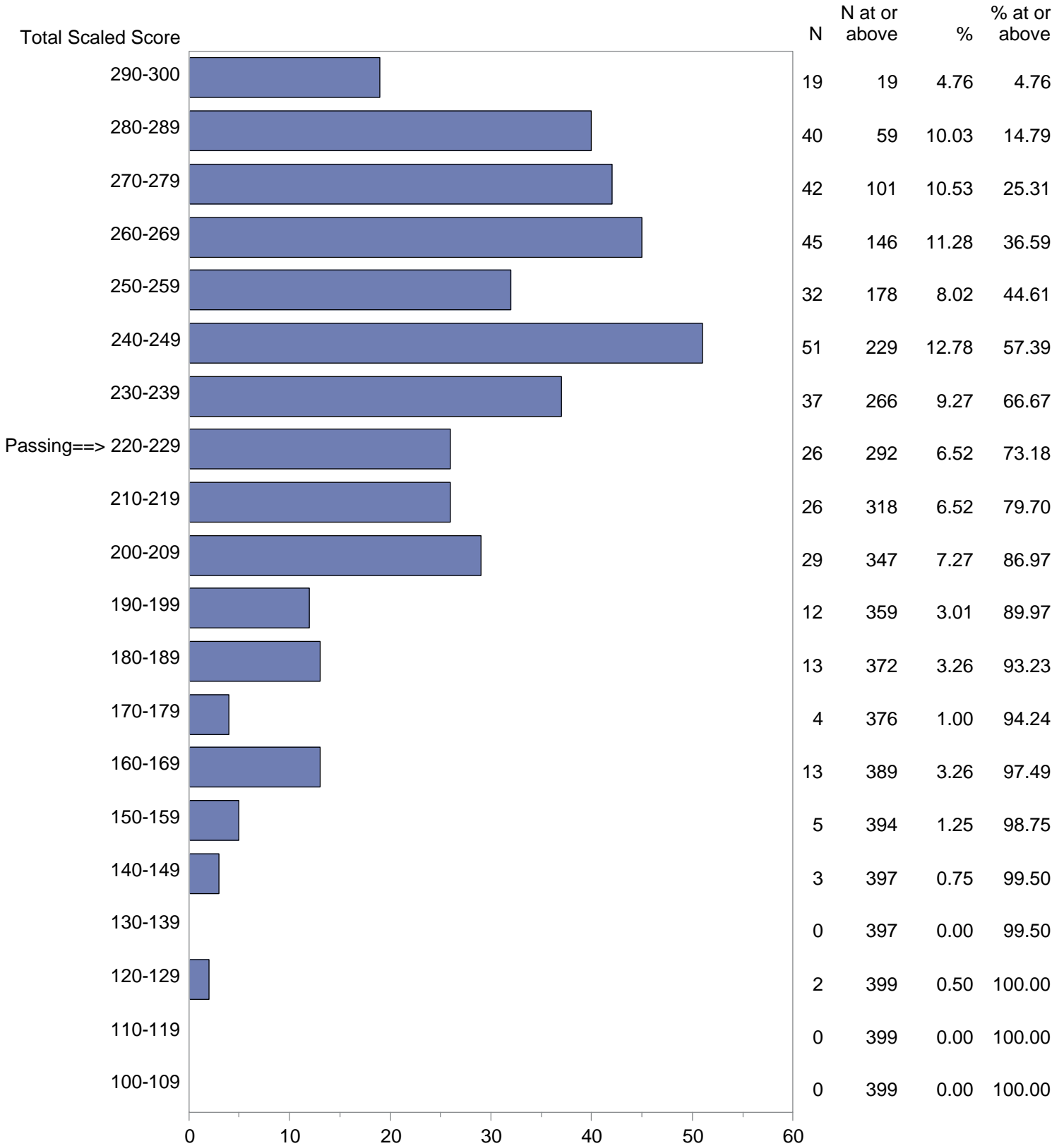
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Mathematics (Elementary) (089)



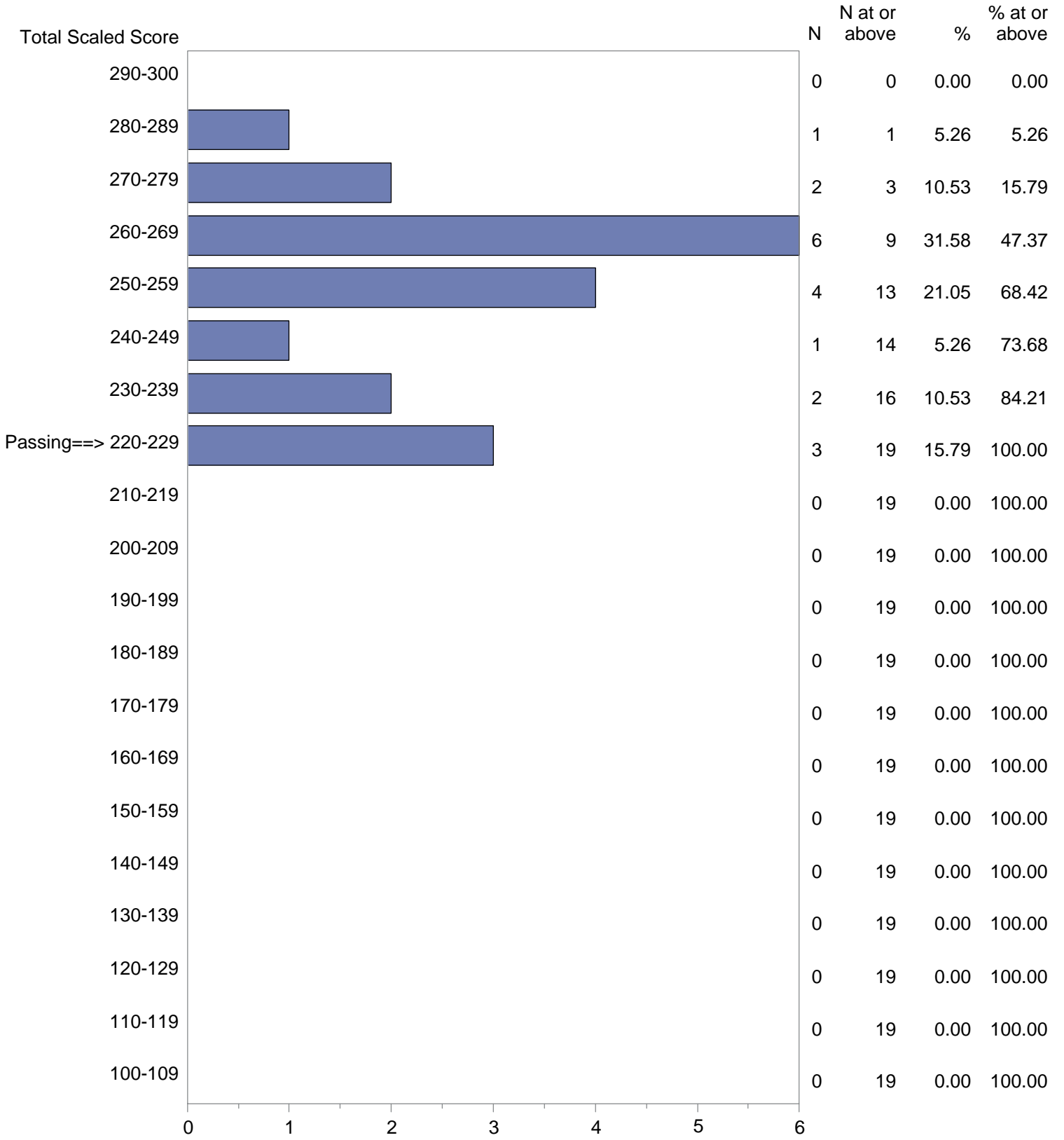
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Michigan Test For Teacher Certification (MTTC)
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 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Mathematics (Secondary) (022)



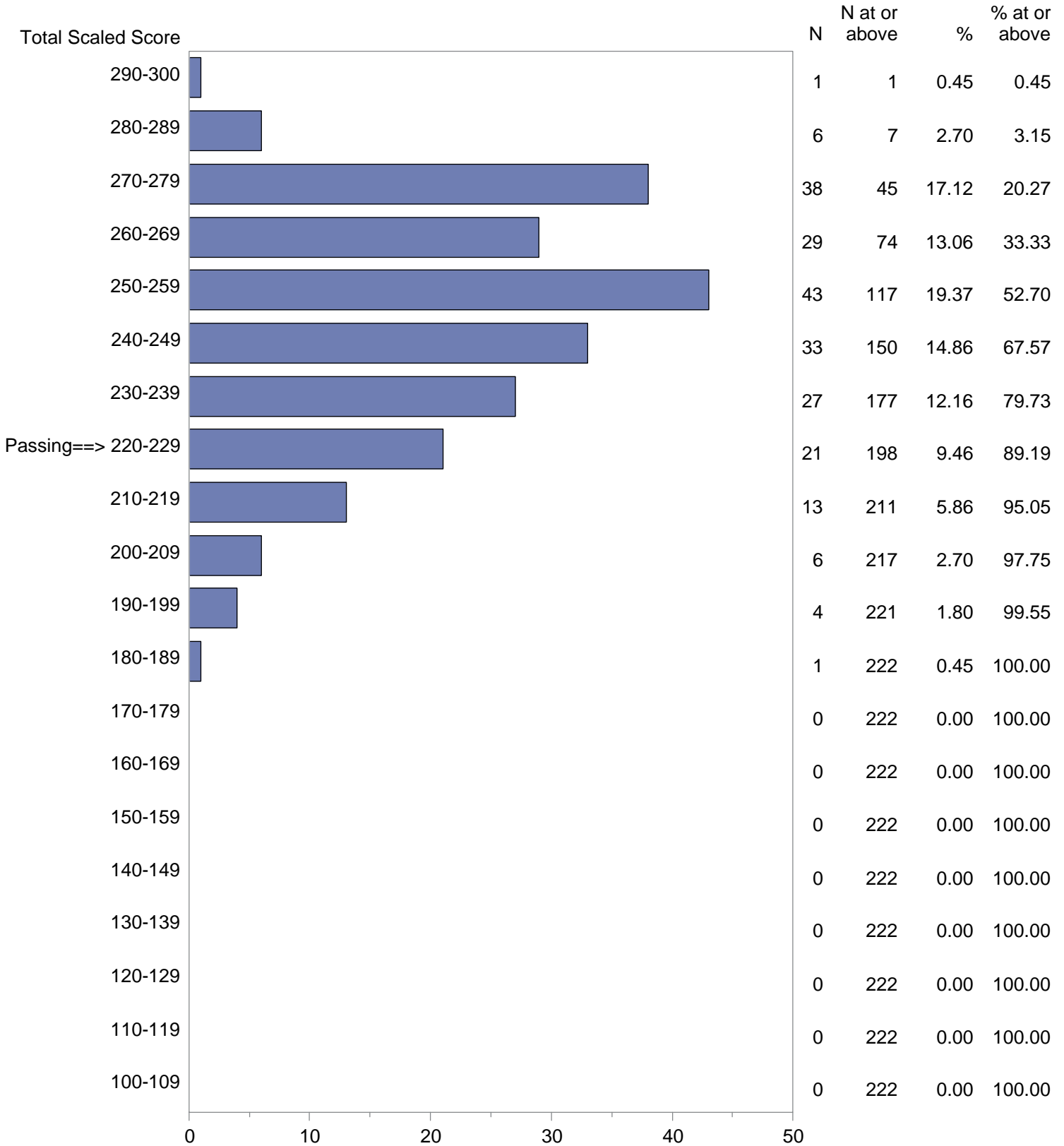
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Middle Level (085)



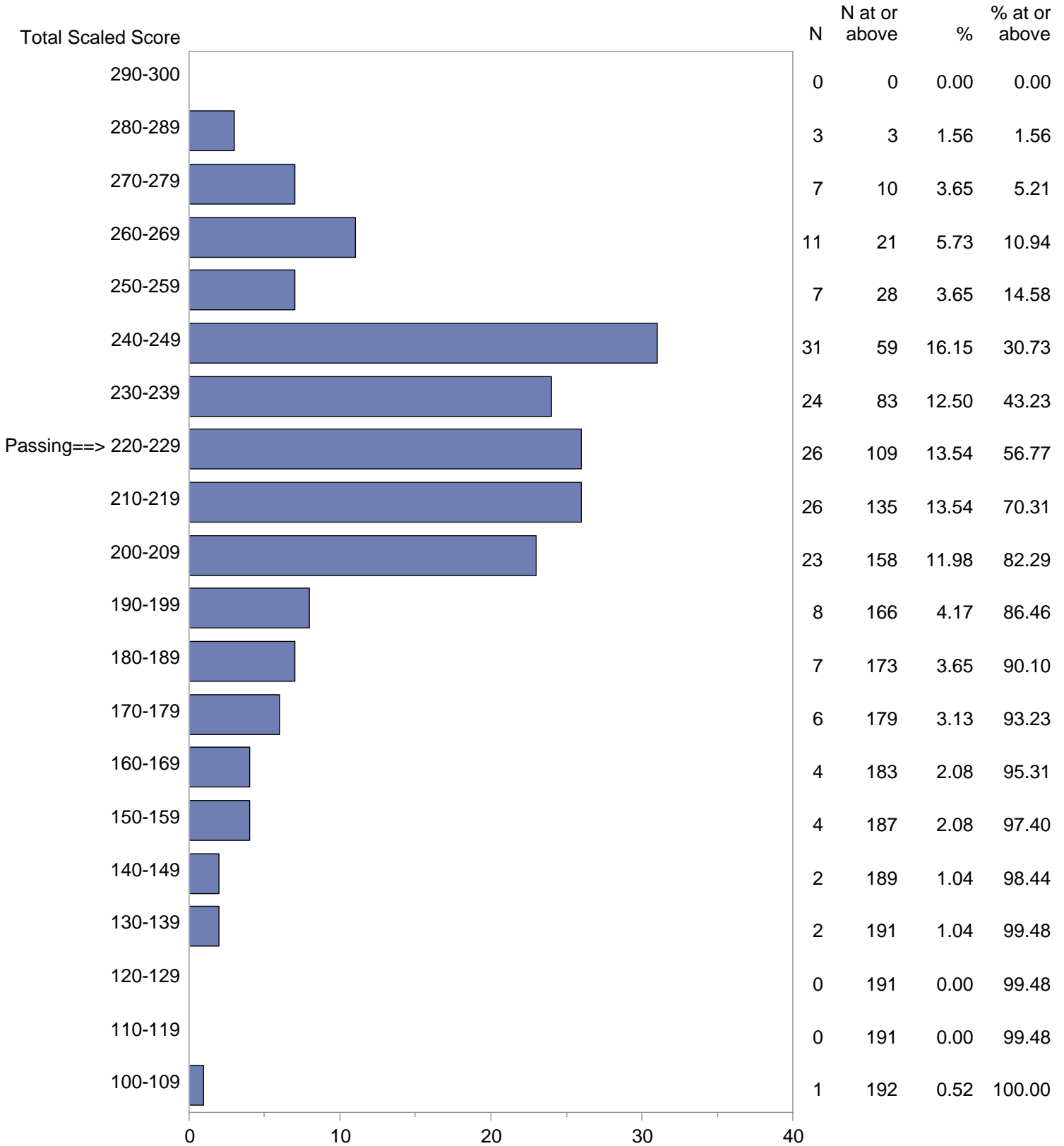
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Music Education (099)



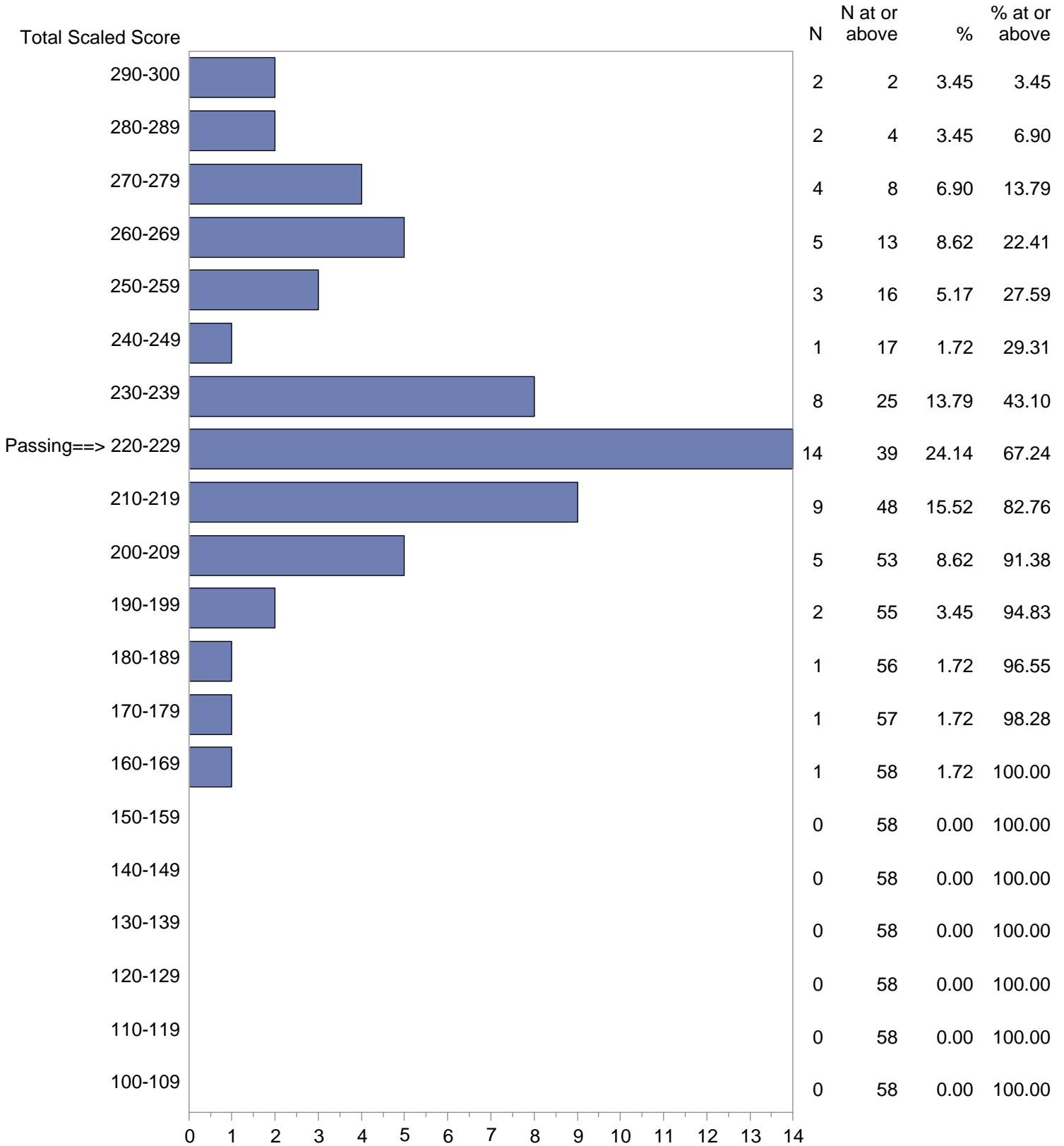
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Physical Education (044)



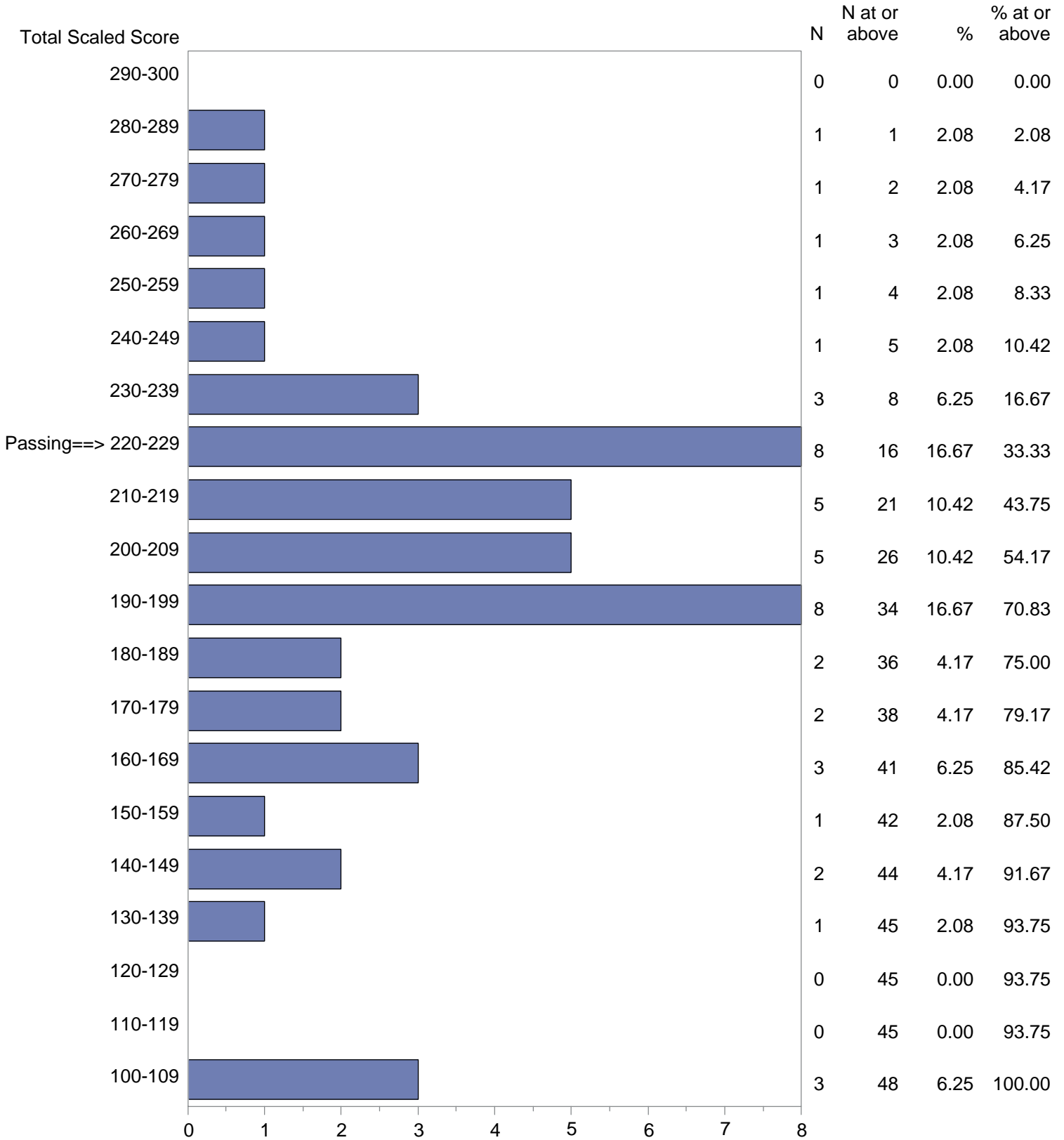
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Physics (019)



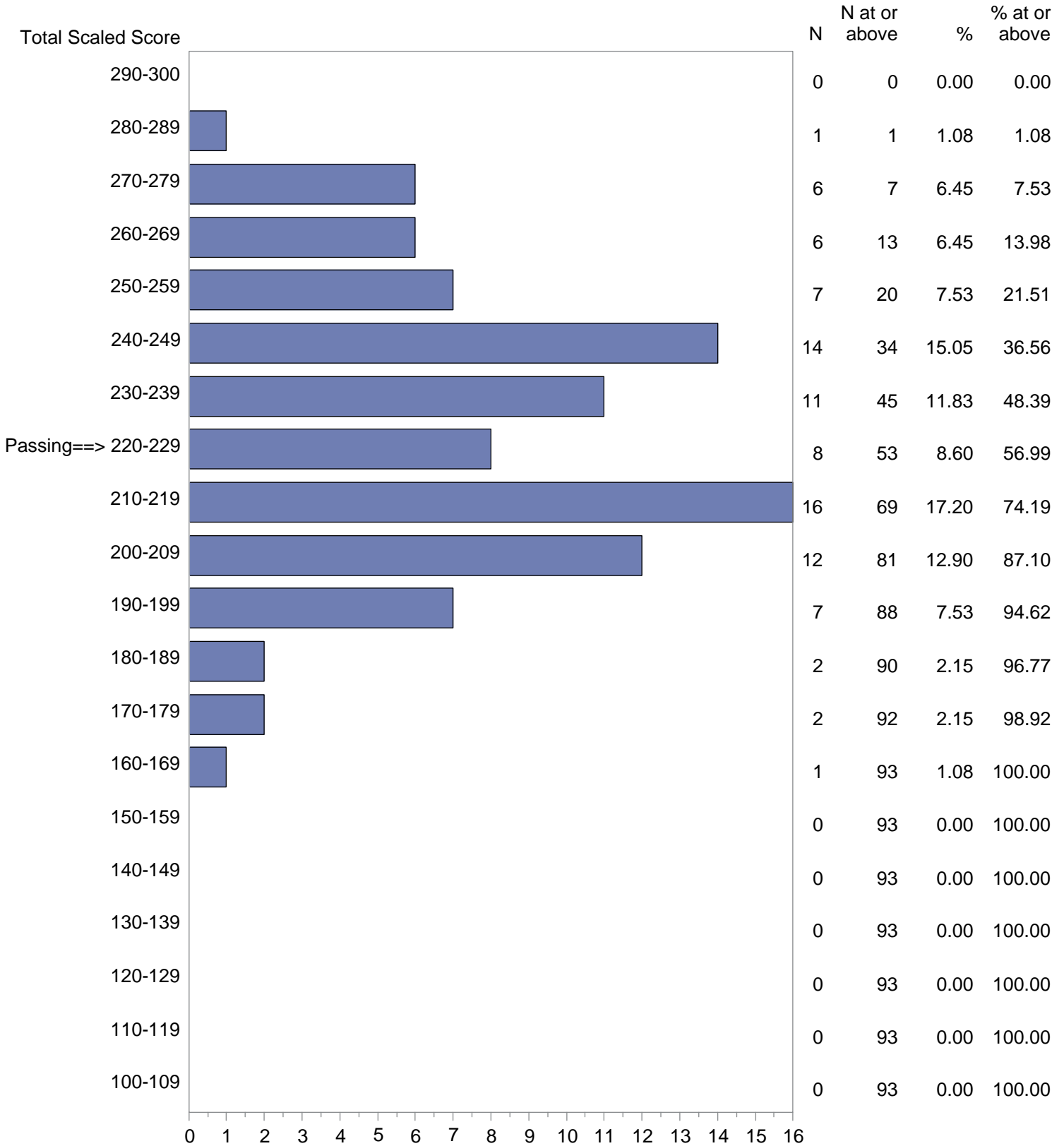
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Political Science (010)



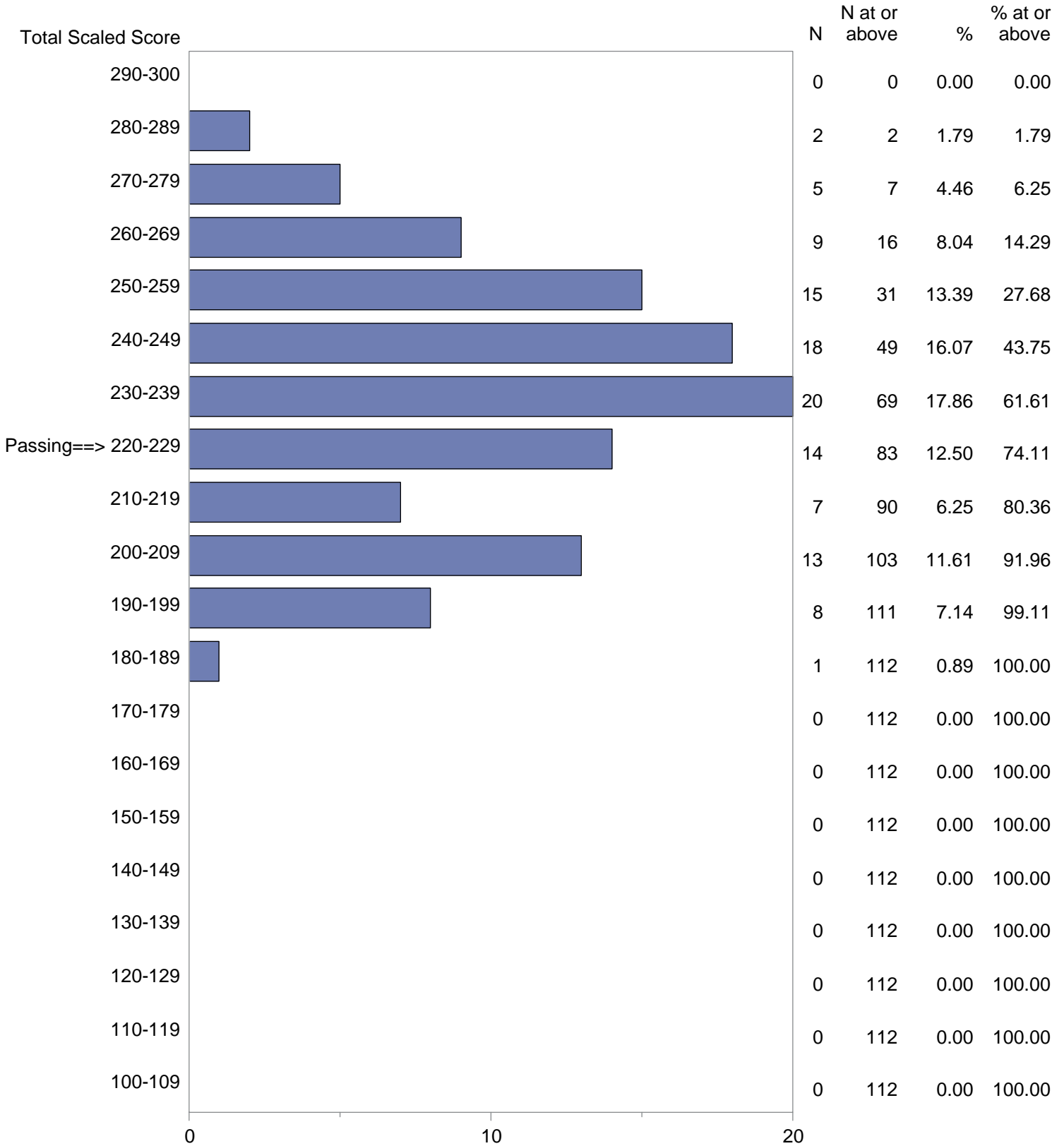
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Psychology (011)



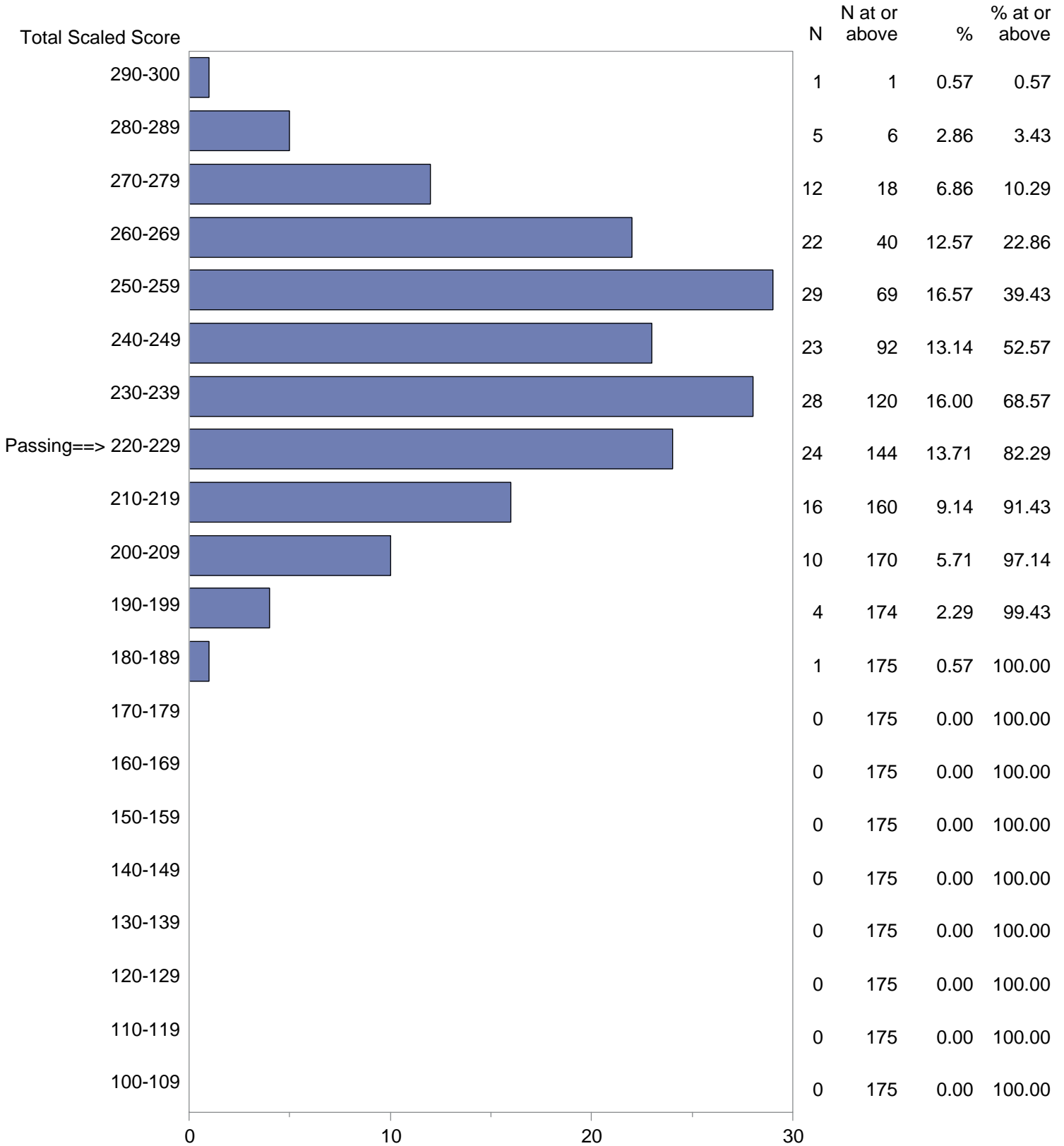
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Reading (005)



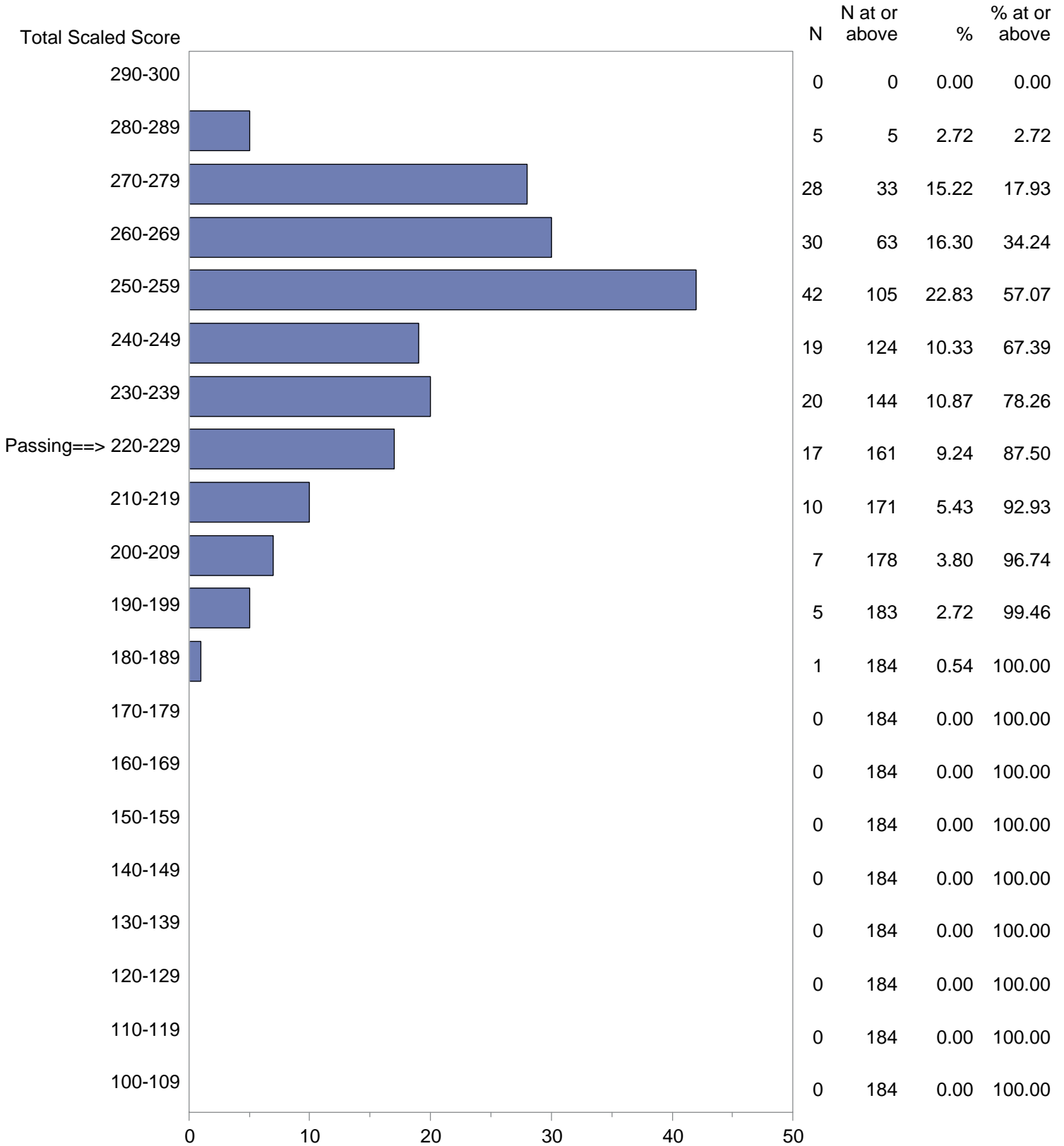
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Reading Specialist (092)



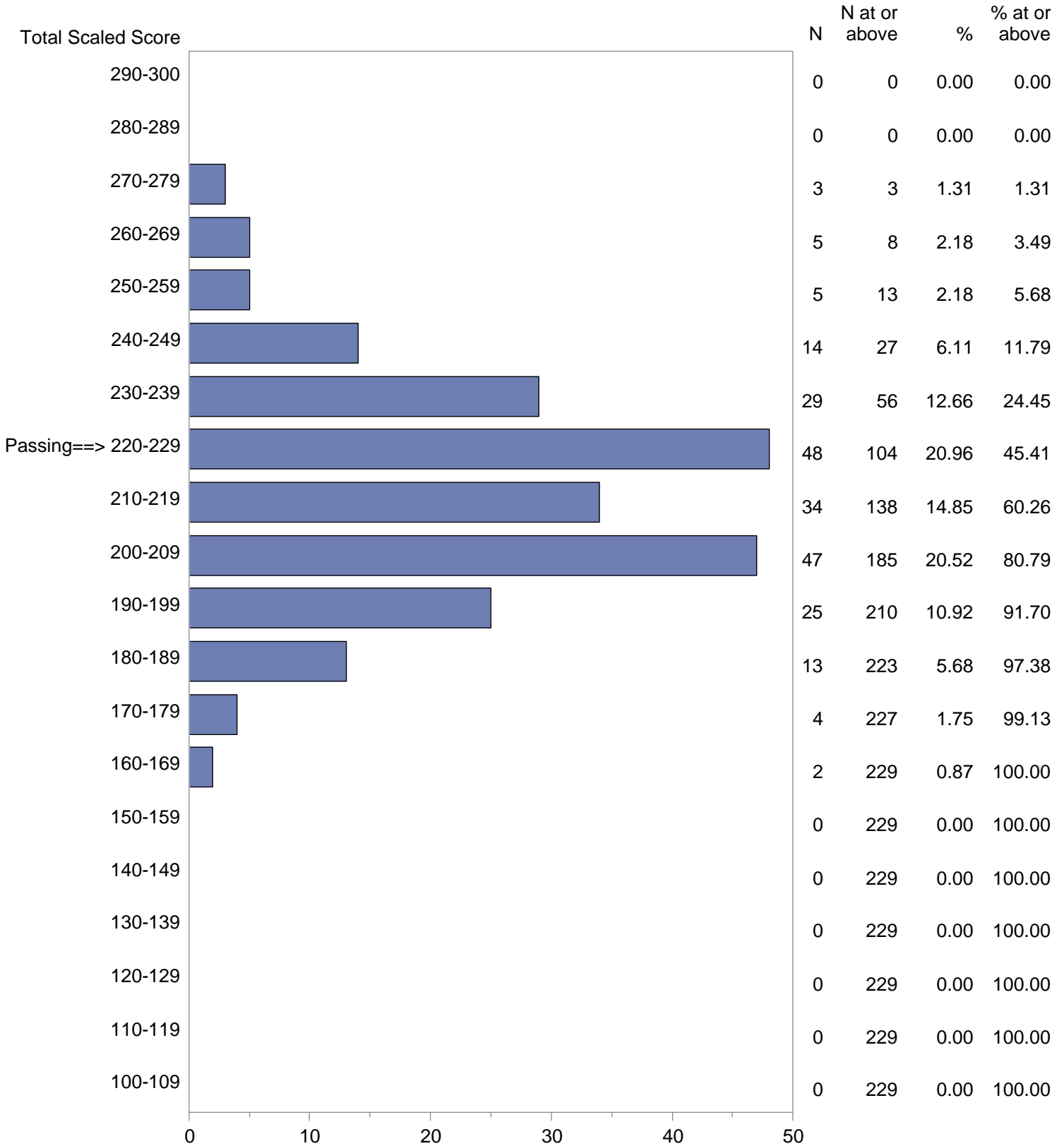
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = School Counselor (051)



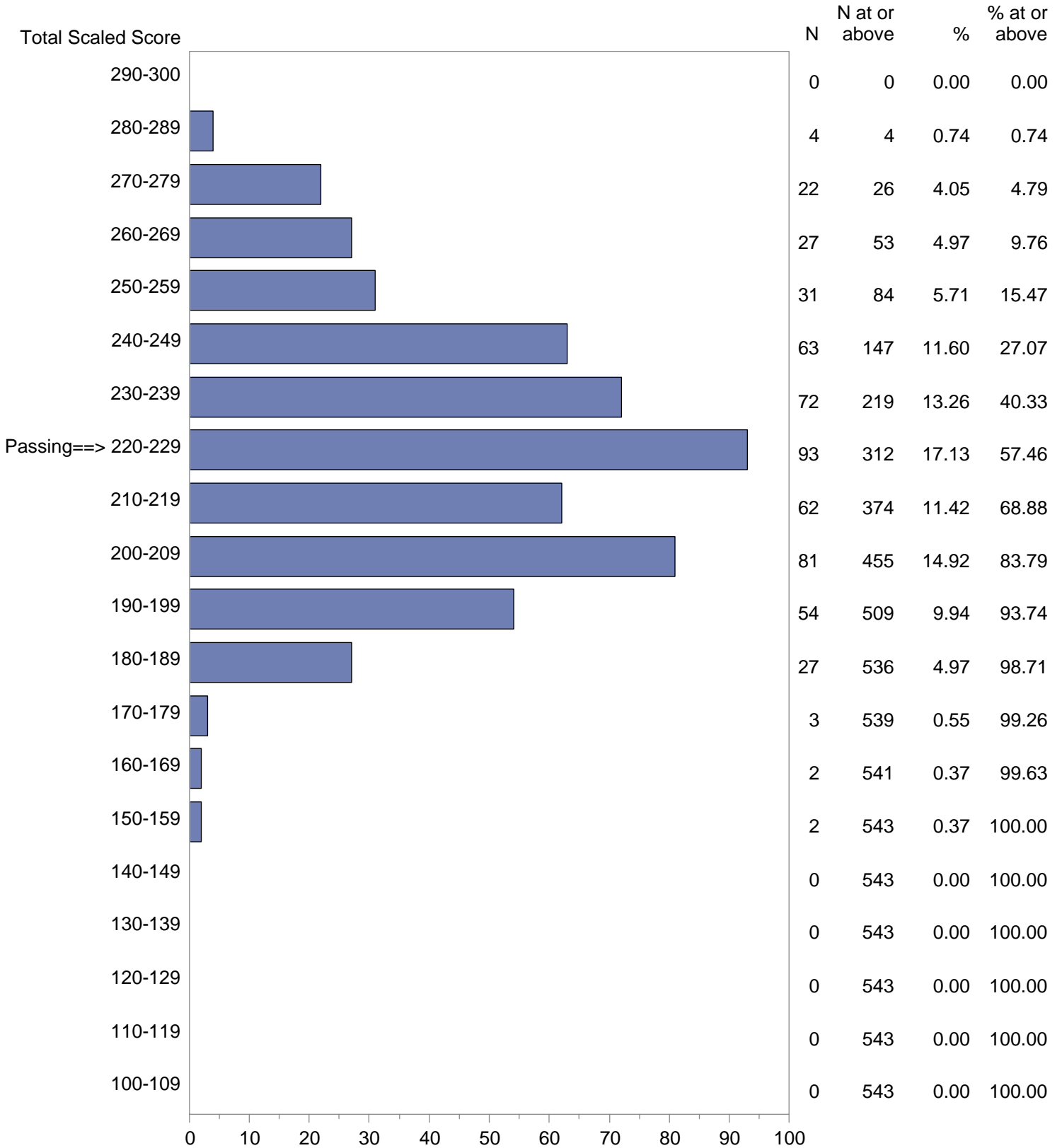
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Social Studies (Elementary) (105)



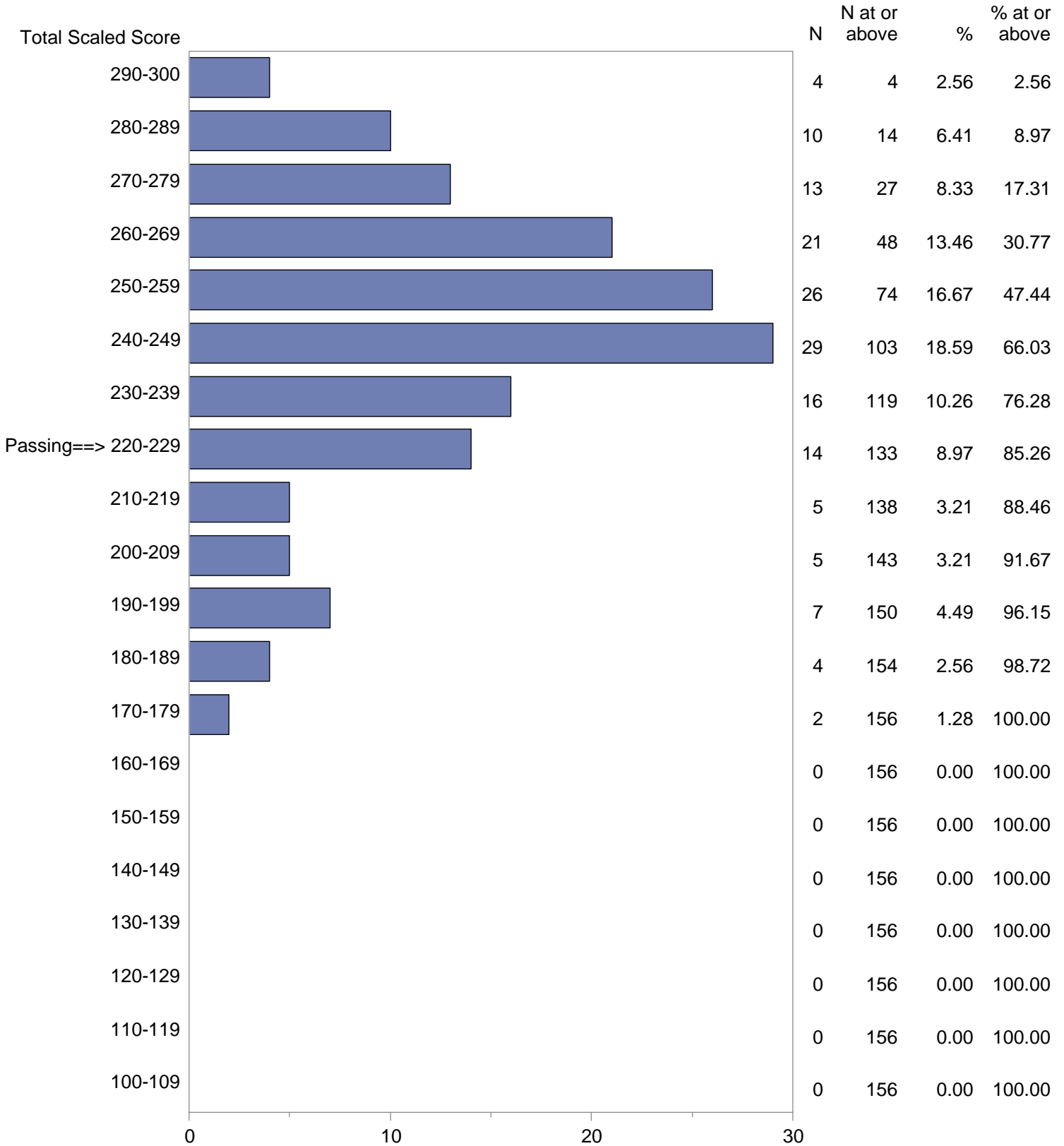
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Social Studies (Secondary) (084)



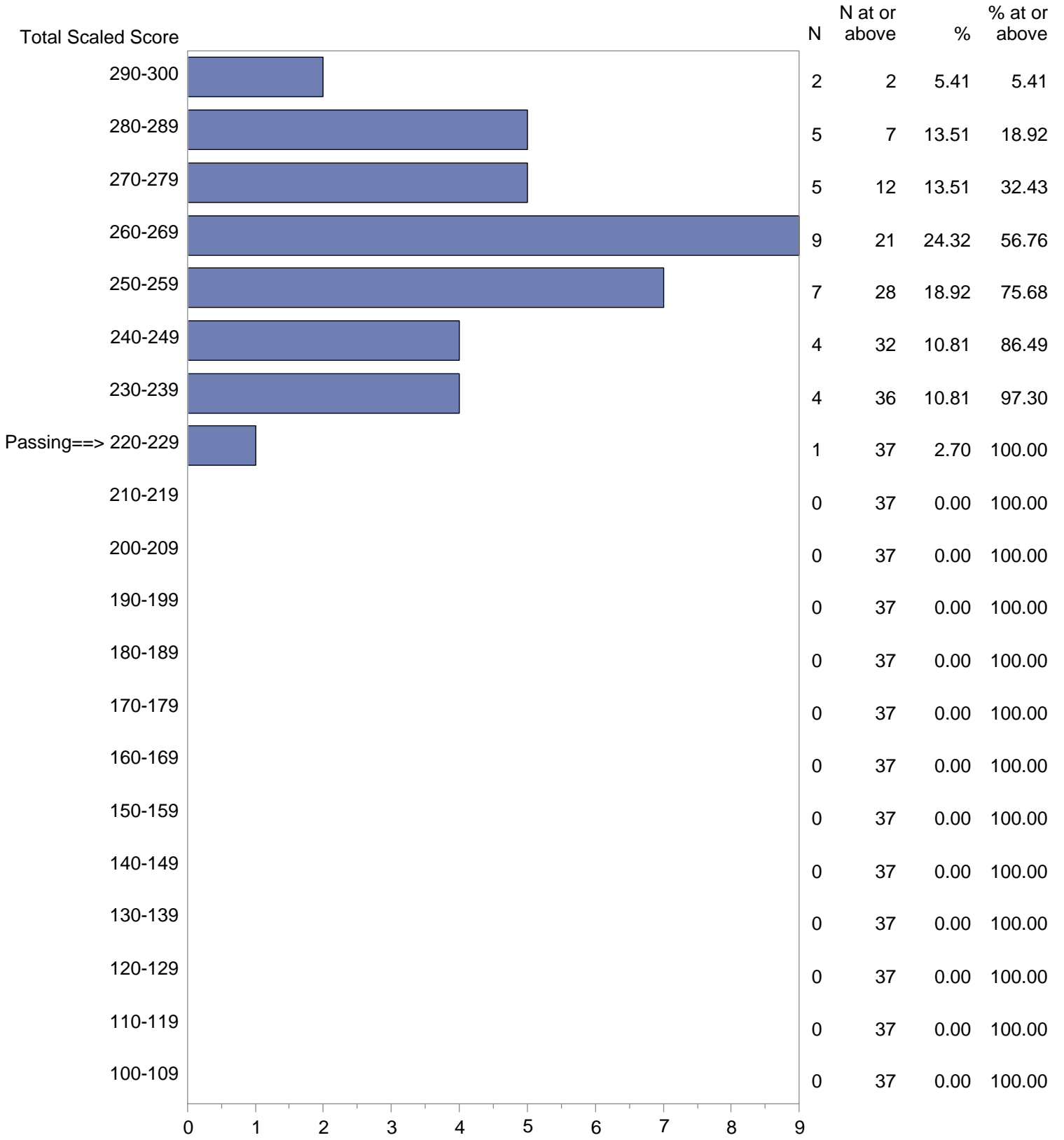
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Spanish (028)



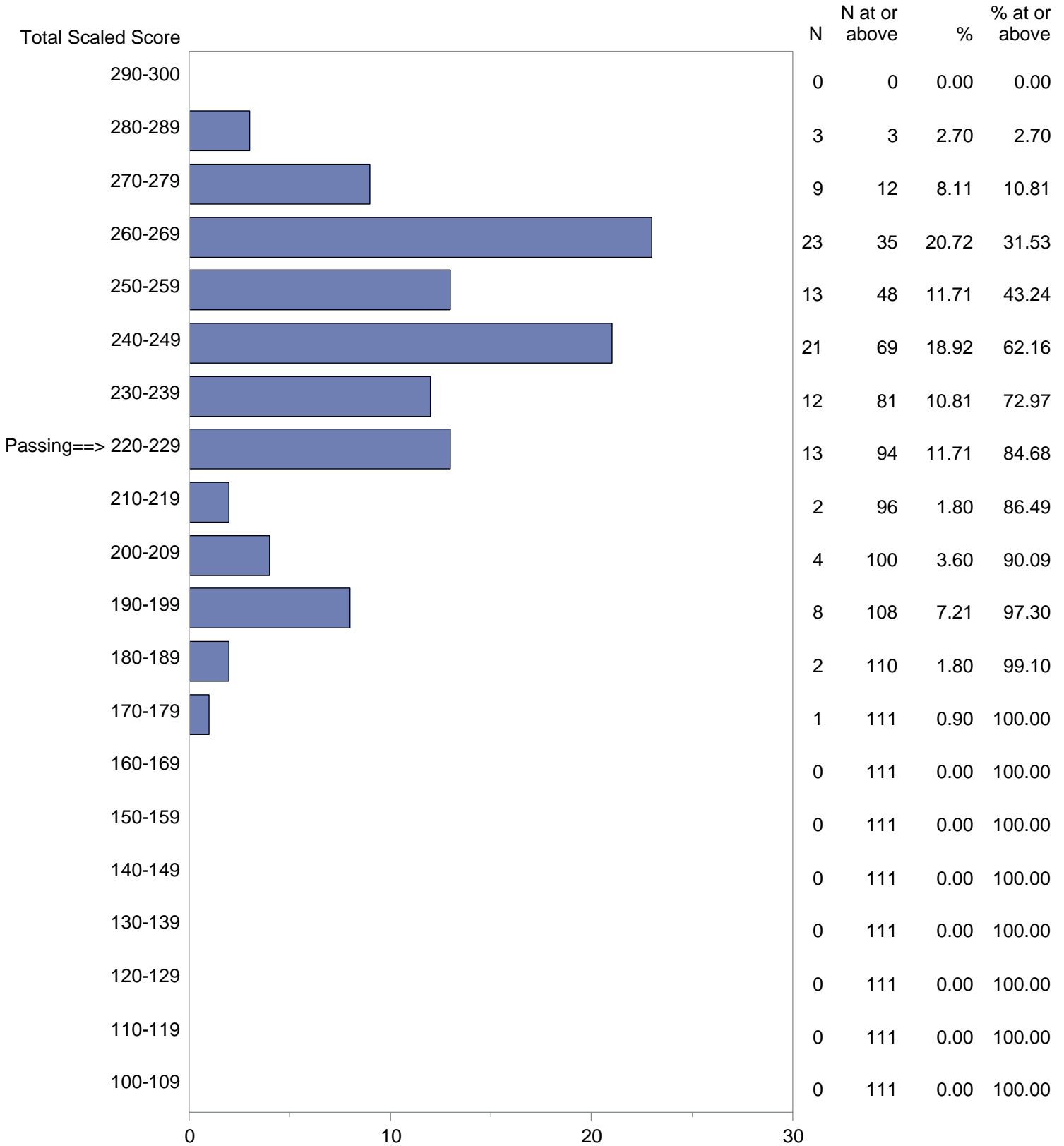
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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Speech (004)



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Michigan Test For Teacher Certification (MTTC)
 October 1, 2015 - September 30, 2016
 Total Scaled Score Distribution by Test Field (All Forms)
 Test Field = Visual Arts Education (095)



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Section IV: References

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