

2007 Annual Summary

Board of Certification (BOC) Certification Examination for Athletic Trainers

CASTLE Worldwide, Inc.

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Introduction

The Board of Certification (BOC) is a nonprofit credentialing agency that provides certification for the athletic training profession. The BOC was incorporated in 1989 to govern the certification program that had existed then for nearly 20 years for entry-level athletic trainers and recertification standards for Certified Athletic Trainers. The entry-level certification program is designed to establish a common benchmark for entry in to the athletic training profession. The BOC serves the public interest by developing, administering, and continually reviewing a certification process that reflects current standards of practice in athletic training.

In order to develop a credible and valid examination, the BOC contracts with CASTLE Worldwide, Inc. (CASTLE) a certification and licensure design, development, and administration service company, and to develop and review the form and item statistics for the currently administered BOC examinations. CASTLE follows and recommends widely accepted standards and regulations (e.g., *Standards for Educational and Psychological Testing*, American Educational Research Association, 1999; *Uniform Guidelines on Employee Selection Procedures*, EEOC, 1978; *Standards for the Accreditation of Certification Programs*, National Commission for Certifying Agencies, 2005) in developing and analyzing the BOC examination.

The aim of BOC's certification is to establish that individuals have the skills and knowledge necessary to create and implement safe and effective athletic training programs. The examinations are designed to test an individual's knowledge across the practice of athletic training based on a defined test blueprint. Questions may be expected in all domains.

The BOC testing year occurs from March 1 to February 28/29 of the following year. The BOC offers candidates five two-week testing windows, March/April, May/June, July/August, November, and February, during the testing year. During each testing window two forms are delivered. These two forms consist of items in common with an anchor form. Candidates who fail are not restricted in their retakes during the testing year.

Beginning in 2006 the BOC undertook a major initiative to computerize its examination and combine the practical and simulation portions (through a hybrid problem) of the examination with the multiple-choice test. For the March/April testing window in the 2007-08 testing year, the testing program was consistent with previous years. This included a 5-option multiple-choice (written) examination with 140 scored items, a simulation examination comprising eight scored problems, and a practical assessment that included from 12 to 13 problems. Candidates were required to pass each examination in order to become certified in athletic training. The multiple-choice examination also included 10 experimental items. Hybrid problems were field tested in March/April 2007, and were part of the scored examination in May/June 2007.

In May/June 2007 the BOC introduced a combined test that consisted of two components, a multiple-choice section with 125 scored items and a hybrid section with two scored problems. The hybrid problems consisted of 12 to 17 items per problem. For 2007-08, no multiple-choice experimental items were placed on the test forms, and two experimental hybrid problems were placed on each test form. The questions are not grouped by subject area or domain in the examinations. Two forms of the multiple-choice component were developed (Form 3612 and 3613).

For the revised examination the two components are combined and candidates are required to pass the combined examination. Due to differences in length, the hybrid problems assigned to a test form are scaled so that each problem is equivalent in its impact on candidate total scores. Candidate raw scores on the hybrid and multiple-choice components of the examination are added with 80% of the candidate's score based on their multiple-choice performance and 20% based on the hybrid component performance. This combined score is then

equated to the multiple-choice anchor form for the current test blueprint, using common-item non-equivalent group equating procedures (Kolen & Brennan, 2004). The equated scores for the examinations are converted via linear transformation so that the raw score passing standard is reported to candidates as 500 on a scale of 200 to 800.

Examinations are conducted in one session and candidates are allotted a period of four hours. There is also a short tutorial prior to the examination and a short, follow-up survey. The BOC uses CASTLE's Internet-based test delivery system (PASS) to deliver the examination through a subcontract using the testing network of ACT.

Candidate Performance

Statistics reported refer to the performance of 'analyzed' candidates. Statistical reports are generated for a particular time period (e.g., an examination window), but on occasion, candidates who arrive at the test location do not take the examination. For these and other reasons, some candidates are excluded from the pool of analyzed data. As a consequence, the number of 'analyzed' candidates may not match the number of reported candidates. As of 2007, the three cohorts of candidates are reported for the BOC examinations are:

1. First time candidates – candidates who tested in the United States, and were reported as first time test takers and/or recent college graduates from athletic training education programs accredited by the Commission on Accreditation of Athletic Training Education Programs (CAATE).
2. Retakes – candidates who tested in the United States and re-sat the examination one or more times.
3. All – candidates who tested in the United States.

Candidates Excluded from this Report

The report does not include, except where noted, those candidates who were administered the examination as paper-and-pencil. The April 2007 candidate performance data are excluded from the remainder of this report, except where noted, as the program they were assessed under is not equivalent to the revised BOC testing program.

Pass Rates

Pass rates for BOC candidates are presented from 2005-06. In 2005-06 new test specifications and the associated passing standard were introduced. All later forms of the examination are equated back to this standard. Pass rates for the current examination can be compared to the pass rates for the multiple-choice examination used for 2005-06 to 2006-07. Table 1 provides annual pass rates for BOC multiple-choice test administrations from 2005-06.

Year	First Time	Pass	% Pass	Retake	Pass	% Pass	All	Pass	% Pass
2005-06	2,074	968	46.7%	3,017	660	21.9%	5,091	1,628	32.0%
2006-07	2,322	1,125	48.5%	3,549	1,076	30.3%	5,871	2,201	37.5%
2007-08	1,495	584	39.1%	3,196	1,073	36.6%	4,691	1,657	35.3%

Table 1: Number of Candidates in Three Cohorts and Pass Rate for BOC Examinations, 2005-06 to 2007-08 (2005-06 and 2006-07, for the Multiple-Choice Examination Only).

The pass rates for the first two years presented are for candidates who passed the multiple-choice (MC) component. From 2007-08 the pass rate is for candidates who passed the combined examination (multiple-choice and hybrid).

As can be seen, the pass rates for the first time candidates on the combined examination are lower than the pass rates for the prior multiple-choice component only. When compared to the percentage of candidates who passed all three previous tests (simulation, multiple-choice, practical) of the examination first time (26.2% in 2005-06, and 31.5% in 2006-07) the pass rate for the new examination is higher. The pass rates for all candidates is similar to pass rates for the prior year’s multiple-choice examination pass rates. The pass rate for retake candidates is higher for the new examination than the previous multiple-choice test.

Distribution of Candidate Scores

Candidate performance for each of the three cohorts is detailed below in the tables and figures. Table 2 details the overall scale score performance for the program since June 2007.

Cohort	N	Avg.	Std. Dev.	Mode	Median	Min	Max
First Time	1,495	472	76	494	476	200	668
Retake	3,196	466	68	440	470	200	686
All	4,691	468	71	494	470	200	686

Table 2: Number of Candidates in Three Cohorts, Minimum, Maximum and Average Scaled Score, Median and Mode Scaled Score, and Standard Deviation (Scaled Score) for BOC Examinations, 2007-08.

An ANOVA test determined that there was a statistically significant but small difference in the scaled scores of retake and first time candidates [$F(1, 4686) = 7.41, p = .006, \eta = .002$]. This small difference was confirmed by an examination of the distribution of scaled scores for first time and retake candidates (Figure 1).

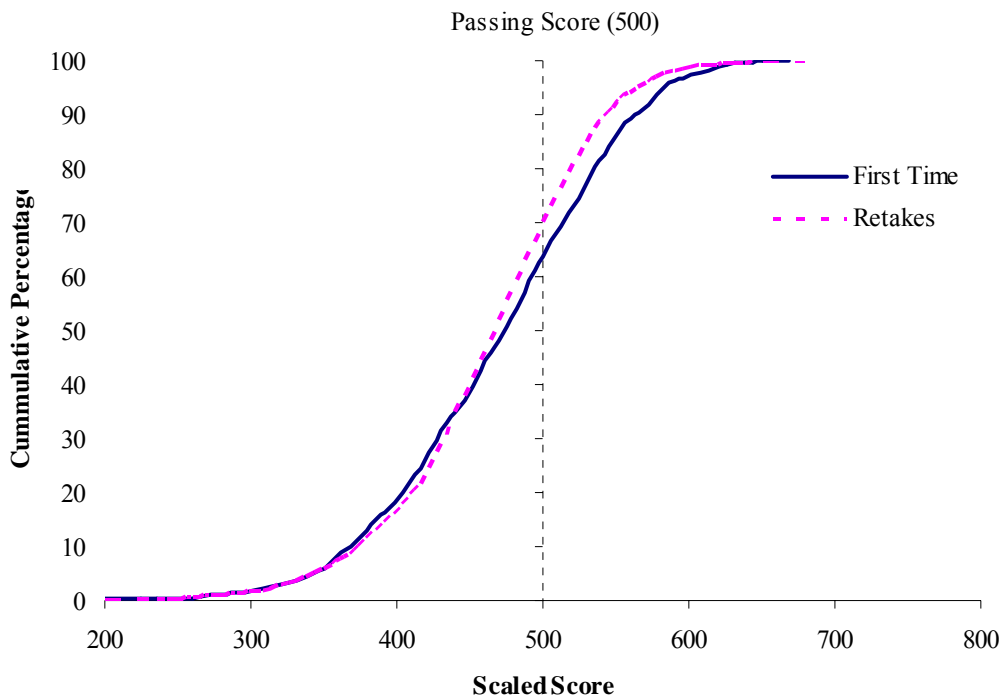


Figure 1: Cumulative Percentage of First Time New Graduates and Retake Candidates by Scaled Score, BOC 2007-08.

Test Form Summary Statistics

For 2007-08 there were ten forms of the BOC examination. The first two forms (3601 and 3611) were administered under the previous test administration protocol. For the remaining eight forms, two core multiple-choice components (3612 and 3613) were assigned different hybrid problems for each test window, creating the eight different test forms. The number of candidates ranged from 375 (Form 3613, February 2008) to 907 (Form 3612, June 2007). Table 3 provides form descriptive statistics.

Exam	N	Mean	SE	Median	Mode	Std. Dev.	Min	Max
3612	909	472	2.30	476	476	69.4	206	656
3613	876	483	2.50	488	464	73.9	200	686
<i>June</i>	<i>1785</i>	<i>478</i>	<i>1.70</i>	<i>482</i>	<i>464</i>	<i>71.8</i>	<i>200</i>	<i>686</i>
3612	548	460	2.91	464	482	68.1	200	650
3613	511	467	3.20	470	422	72.4	224	656
<i>Aug</i>	<i>1059</i>	<i>463</i>	<i>2.16</i>	<i>470</i>	<i>482</i>	<i>70.3</i>	<i>200</i>	<i>656</i>
3612	532	459	2.89	458	440	66.6	200	632
3613	552	466	3.04	473	500	71.3	236	638
<i>Nov</i>	<i>1084</i>	<i>462</i>	<i>2.10</i>	<i>464</i>	<i>494</i>	<i>69.1</i>	<i>200</i>	<i>638</i>
3612	387	456	3.45	464	470	67.8	200	638
3613	376	458	3.43	458	434	66.6	200	626
<i>Feb</i>	<i>763</i>	<i>457</i>	<i>2.43</i>	<i>464</i>	<i>470</i>	<i>67.2</i>	<i>200</i>	<i>638</i>
TOTAL	4691	468	1.03	470	494	70.5	200	686

Table 3: Summary Test Form Statistics in Scaled Scores for All Candidates for BOC Examinations, 2007-08.

Test Form Internal Reliabilities

As noted earlier, the number of individual items on a hybrid problem varies. If hybrid problem items were added to each of the form's scored multiple-choice items, the total number of elements that form an analysis for reliability would differ slightly from form to form. As a consequence, reliability estimates were made separately for each component of the examination, and a study undertaken to assess the relationship between the two components. For the hybrid problems, as the scores are not dichotomous data (0 and 1), Cronbach's alpha was used to determine reliability (Cronbach, 1951). For review purposes, Cronbach's alpha was also computed for the multiple-choice elements.

Table 4 details the K-R20, Standard Error of Measurement and Cronbach's alpha.

N	MC K-R20	Std. Error	MC alpha	Hybrid alpha	Combined alpha
4684	.77	4.73	.78	.30	.55

Table 4: Internal Reliability Estimates for Multiple-Choice for All Candidates for BOC Examinations, 2007-08

Conclusion

Statistics concerning the quality of the BOC examination as a measurement device indicate that the multiple-choice section of the examination complies with psychometric requirements that pertain to certification and licensure tests. Notably, estimates of reliability and equivalence across forms for the various parts of the examination are quite strong. Likewise, candidate performance on all parts of the examination is consistent with the public protection mission of the BOC.

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