

**2006 Annual Report for the
National Athletic Trainers' Association Board of Certification, Inc.**

**CASTLE Worldwide, Inc.
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The National Athletic Trainers' Association Board of Certification, Inc. (BOC) undertook a major initiative during the 2006 testing year to computerize its examination and combine the practical and simulation portions of the test with the written (multiple-choice) test as a hybrid examination. Although this test revision effort took place during the testing year, the traditional three-part test was used throughout the 2006 testing year. Hybrid problems will be field tested beginning in April, 2007, and it is anticipated they will be scored beginning in June, 2007. The BOC has devoted considerable energy to the design of the new examination format and to the prototype problems, along with materials to inform candidates about the nature of the new test and how to take it.

The Written, Simulation, and Practical Portions of the Examination

The BOC examination used in the 2006 testing year includes a written (multiple-choice) examination with 140 scored items, a simulation examination comprising eight scored problems, and a practical assessment that includes from 12 to 13 problems. Candidates must pass each examination in order to become certified in athletic training. Each of the three parts of the test are designed to assess if candidates have sufficient knowledge, skill, and judgment as required for the practice of athletic training.

Analysis of the Examination

The BOC undertakes many steps to ensure that its test adheres to pertinent requirements for examinations that are used in professional certification and licensure. Psychometric analysis is performed to investigate the three parts of the BOC examination and the manner in which each supports the BOC's decision making regarding the award or denial of certification. In complying with psychometric requirements, the BOC examination achieves the high level of validity and fairness essential to its stakeholders.

Reliability

Among the essential properties of an examination is reliability, which is an estimate of the consistency of scores as a measure of competence. Table I reports reliability coefficients for all parts of the BOC examination for each form used during testing year. The Kuder Richardson [KR(20)] coefficient evaluates internal consistency reliability to describes the degree to which items on the test contribute consistently to candidates' scores. The standard error of measurement provides the range in which the candidate's true score (if measured in absence of any error) resides. Relating to the practical, interrater reliability may be described as the percent of instances in which the examiners both mark "yes" plus the instances in which both mark "no" on the scoring criteria for individual candidates. Calculated as an intraclass correlation, interrater reliability evaluates consistency in the summary scores provided by each examiner.

Table I. Examination Reliability and Standard Error of Measurement (S.E.M)

	Written (Apr)		Written (Jun)		Written (Aug)		Written (Nov)		Written (Jan)	
Form	351	352	351	352	351	352	351	352	351	352
Reliability	0.83	0.79	0.85	0.83	0.84	0.80	0.82	0.83	0.81	0.81
S.E.M.	5.08	4.94	5.16	5.02	5.18	5.07	5.16	5.01	5.17	5.05
n	811	825	786	775	455	429	510	509	362	407

	Practical					Simulation				
Form	355 (Apr)	356 (Jun)	357 (Aug)	358 (Nov)	355 (Jan)	353 (Apr)	354 (Jun)	353 (Aug)	354 (Nov)	345 (Jan)
Intl Consist	0.70	0.68	0.75	0.71	0.72	0.80	0.88	0.84	0.82	0.89
S.E.M.	3.02	3.41	2.83	3.00	3.20	7.96	8.21	8.50	8.21	7.69
%Agreement	89.85	89.94	92.97	88.55	88.56	NA	NA	NA	NA	NA
n	1153	1163	559	508	350	1379	1163	561	544	347

Candidate Performance on the Examination

Table II presents information about first-time and retake candidates in combination across all five test dates during the 2006 testing year. Altogether, 5871 candidates took the written test, 3733 took the practical, and 3989 candidates sat for the simulation. Table II reports the performance of the total candidate group on each part of the examination.

Table II. All Candidates Taking the Examinations

Exam	# Candidates	# Pass	% Pass	# Fail	% Fail
Written	5871	2201	37.49	3670	62.51
Practical	3733	2353	63.03	1380	36.97
Simulation	3989	2227	55.83	1762	44.17

First-time candidates in 2006 were graduates from athletic training education programs accredited by the Commission on Accreditation of Athletic Training Education Programs (CAATE). As reported in Table III, 2322 individuals took the written examination for the first time, and 48.45% passed. The number of first-time candidates taking the practical in 2006 was 2156, with 67.97% passing. Of the 2338 individuals taking the simulation examination for the first time in 2006, 60.91% passed. Annual Reports prior to 2006 compared the performance of internship and curriculum candidates; however, the BOC no longer accepts the graduates of internship courses of study.

Table III. Candidates Taking the Examination for the First Time

Exam	Total Sitting	Number Pass	% Pass	Number Fail	% Fail
Written	2322	1125	48.45	1197	51.55
Practical	2154	1464	67.97	690	32.03
Simulation	2338	1424	60.91	914	39.09

2222 candidates took all three parts of the test in their first attempt, and 1042, or 46.89%, passed. Table IV provides detail about the performance of this group.

Table IV. First Time Candidates Passing All Three Parts on First Attempt

Total Sitting	Total Pass	Total Pass %	Total Fail	Total Fail %
2222	1042	46.89	1180	53.11

Table V reports the performance of candidates who retook all or portions of the examination in 2006. Retake candidates included 3549 taking the written (multiple-choice) portion, and 30.32% of them passed. A total of 1579 individuals retook the practical portion of the examination and 56.30% of them passed. Simulation retake candidates totaled 1651 with 48.64% passing. Internship candidates retaking the test in 2006 had qualified for the examination in 2004 or before and failed at least some portion of it in that year. Although the performance of internship candidates is reported in Table V, it is important to understand that it is not appropriate to evaluate the statistical significance of any observed differences. Such comparisons should be based only on first-time candidate groups.

Table V. Candidates Retaking the Examination

Exam	Total Sitting	Number Pass	% Pass	Number Fail	% Fail
Written	3549	1076	30.32	2473	69.88
Practical	1579	889	56.30	690	43.70
Simulation	1651	803	48.64	848	51.36

Descriptive Statistics of Candidate Performance

Descriptive statistics for each form of the BOC examination are shown in Table VI. Scaled scores ranged from 35 to 139 (out of 150 scale-score points) on Form 351 and 51 to 138 for form 352 for the multiple-choice examination. High scores on the practical were 49, 48, 45, 47, and 45 on a scale from 0 to 50. Alternatively, low scores on the practical were 14, 5, 10, 14, and 7. The written simulation is scaled from 200 to 800, with the passing standard anchored at 500. High scores were 714, 724, 715, 729, and 704, while the low score was 200 on each form and test date. Table VI provides detail about candidate performance on each part of the BOC examination.

Table VI. Candidate Scores

	Written Form 351		Written Form 352		
Low Score	35		51		
High Score	139		138		
Avg. Score	99.97		102.42		
Std. Dev.	12.70		11.55		

	Practical Form 355 (Apr)	Practical Form 356 (Jun)	Practical Form 357 (Aug)	Practical Form 358 (Nov)	Practical Form 355 (Jan)
Low Score	14	5	10	14	7
High Score	49	48	45	47	45
Avg. Score	40.43	35.72	20.05	35.85	34.15
Std. Dev.	4.98	5.92	2.21	5.58	6.04

	Simulation Form 353 (Apr)	Simulation Form 354 (Jun)	Simulation Form 353 (Aug)	Simulation Form 354 (Nov)	Simulation Form 345 (Jan)
Low Score	200	200	200	200	200
High Score	714	724	715	729	704
Avg. Score	500.97	501.01	500.75	500.83	500.69
Std. Dev.	98.37	98.28	99.19	98.85	99.35

There are six performance domains in the content framework for the examination, consistent with the Role Delineation Study upon which the examination is based (2004). Table VII reports descriptive statistics at the domain level for the written examination, for form 351 first and then for form 352. The Role Delineation Study also provides the basis for the practical and simulation tests but it is not possible to compute domain-level scores for those tests because of their weighting structure.

Table VII. Domain Scores (Raw) for Written Examination Form 351 and 352

	Form 351 Domain 1	Form 351 Domain 2	Form 351 Domain 3	Form 351 Domain 4	Form 351 Domain 5	Form 351 Domain 6
Number of Items	22	32	24	33	16	13
High Score	21	32	23	31	16	13
Low Score	4	7	4	7	3	2
Avg. Score	12.99	21.98	15.61	20.54	11.29	8.94
Std. Dev.	2.58	3.96	2.75	3.91	1.97	1.77

Table VII. (Continued)

	Form 352 Domain 1	Form 352 Domain 2	Form 352 Domain 3	Form 352 Domain 4	Form 352 Domain 5	Form 352 Domain 6
Number of Items	22	32	24	33	16	13
High Score	22	32	23	31	16	13
Low Score	5	6	5	6	5	3
Avg. Score	14.33	22.29	15.80	20.55	11.27	8.88
Std. Dev.	2.23	3.59	2.53	3.76	1.85	1.79

Conclusion

Statistics concerning the quality of the BOC examination as a measurement device indicate that 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.

The BOC invests considerable energy and resources to ensure that the examination and all aspects of its development and administration are fair and of high quality. The organization implements an examination program that maintains excellent validity and reliability as a measure of entry-level competence in the athletic training.

Appendix A

Summary of the Written and Practical Parts of the BOC Examination

Summary of Written Examination Form 351

Summary Table of Item Difficulty for 140 Scored Items

<i>Difficulty Ranges</i>	<i>Number of Items</i>
90-100	14
80-89.9	18
70-79.9	33
60-69.9	32
50-59.9	23
40-49.9	10
30-39.9	8
20-29.9	1
10-19.9	1
0-9.9	

Summary Table of Item Discrimination for 140 Scored Items

<i>Discrimination Ranges</i>	<i>Number of Items</i>
.90-1.00	
.80-.899	
.70-.799	
.60-.699	
.50-.599	
.40-.499	1
.30-.399	16
.20-.299	60
.10-.199	48
0-.099	13
Less than 0	2

Summary of Written Examination Form 352

Summary Table of Item Difficulty for 140 Scored Items

<i>Difficulty Ranges</i>	<i>Number of Items</i>
90-100	10
80-89.9	23
70-79.9	19
60-69.9	37
50-59.9	29
40-49.9	9
30-39.9	8
20-29.9	4
10-19.9	
0-9.9	1

Summary Table of Item Discrimination for 140 Scored Items

<i>Discrimination Ranges</i>	<i>Number of Items</i>
.90-1.00	
.80-.899	
.70-.799	
.60-.699	
.50-.599	
.40-.499	
.30-.399	4
.20-.299	39
.10-.199	71
0-.099	21
Less than 0	5

Summary of Practical Examination Form 355

Summary Statistics of Candidates Performance on the Examination

	No. of Points	Low Score	High Score	Mean Score	Variance	Std Dev
Problem 1	8	0	7.5	5.36	2.80	1.67
Problem 2	9	0	5.5	4.69	.99	.99
Problem 3	9	.45	5.5	4.75	.86	.93
Problem 4	12	.70	8.5	6.99	1.34	1.16
Problem 5	9	0	8.5	7.62	2.00	1.41
Problem 6	12	1.05	8.5	5.93	2.04	1.43
Problem 7	10	.33	6.0	5.09	.88	.94

Summary of Practical Examination Form 356

Summary Statistics of Candidates Performance on the Examination

	No. of Points	Low Score	High Score	Mean Score	Variance	Std Dev
Problem 1	8	0	7.5	5.01	3.46	1.86
Problem 2	4	0	4.0	2.74	.99	1.00
Problem 3	9	0	3.5	2.51	.67	.82
Problem 4	12	0	8.5	6.71	2.09	1.45
Problem 5	7	0	5.5	4.01	2.90	1.70
Problem 6	12	0	9.0	6.11	2.48	1.58
Problem 7	7	0	6.5	5.27	1.24	1.11
Problem 8	9	0	5.5	3.28	2.01	1.42

Summary of Practical Examination Form 357

Summary Statistics of Candidates Performance on the Examination

	No. of Points	Low Score	High Score	Mean Score	Variance	Std Dev
Problem 1	12	.75	6	4.07	1.09	1.05
Problem 2	12	0	8.5	6.73	1.85	1.36
Problem 3	4	.75	3.5	3.39	.27	.52
Problem 4	4	.40	3.5	3.22	.61	.78
Problem 5	4	.80	3.5	3.36	.32	.56
Problem 6	8	0	7.5	5.35	3.37	1.84
Problem 7	5	2.0	8.5	6.77	1.44	1.20
Problem 8	5	1.28	5.5	4.49	1.16	1.08
Problem 9	7	0	3.5	2.72	.53	.73

Summary of Practical Examination Form 358

Summary Statistics of Candidates Performance on the Examination

	No. of Points	Low Score	High Score	Mean Score	Variance	Std Dev
Problem 1	12	0	8.5	6.82	1.57	1.25
Problem 2	8	0	7.5	5.39	2.94	1.72
Problem 3	7	0	6.5	4.80	3.65	1.91
Problem 4	9	0	6.5	5.30	1.88	1.37
Problem 5	7	.45	8.5	5.73	5.58	2.36
Problem 6	5	0	6.0	3.73	1.81	1.34
Problem 7	9	0	6.5	4.72	1.52	1.23

Summary of Practical Examination Form 355

Summary Statistics of Candidates Performance on the Examination

	No. of Points	Low Score	High Score	Mean Score	Variance	Std Dev
Problem 1	8	0	7.5	5.54	2.95	1.72
Problem 2	9	0	5.5	4.50	1.25	1.12
Problem 3	9	.23	5.5	4.58	1.06	1.03
Problem 4	12	1.40	8.5	9.87	1.49	1.22
Problem 5	9	0	8.5	7.11	4.33	2.08
Problem 6	12	.70	8.5	5.21	2.45	1.57
Problem 7	10	.28	6.0	4.86	1.06	1.03