

QUALITY AND FAIRNESS

Casualty Actuarial Society Audit

Executive Summary

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The purpose of the Chauncey Group's audit of the Casualty Actuarial Society's testing program was to provide an independent review of the current procedures for the development and administration of the CAS tests. This review is based on the degree to which the CAS program meets or exceeds each of the standards as set out in the *Standards for Quality and Fairness* developed by Educational Testing Service (ETS) and published in 2000. The ETS *Standards* closely reflect the *Standards for Educational and Psychological Testing*, published jointly by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. They differ slightly in that their focus is specifically on educational measurement within the context of customer requirements.

The audit process began with the development of program commentary by CAS on each of the following chapters: Customer Service; Fairness; Uses and Protection of Information; Validity; Assessment Development; Reliability; Cut Scores, Scaling, Equating; Assessment Administration; Reporting of Assessment Results; Assessment Use; and Test Takers' Rights and Responsibilities. For each of the chapters, CAS provided the relevant documentation to the Chauncey Group auditors for initial review.

The Chauncey Group auditors met with members of CAS staff and volunteer committees in order to learn more about how the program operates and to have preliminary questions answered. Following these conversations, the auditors reviewed additional material and prepared commentary on each of the chapters. Below is a brief description of the content for each chapter, the commentary and a list of documents provided from CAS, and a summary of the recommendations by the auditors. Also provided in this summary, where appropriate, are CAS actions taken to date as a result of the audit recommendations.

Customer Service

The focus of the Customer Service chapter is how well CAS meets customer needs and maintains high quality in the design, development, and delivery of its products and services. The chapter recommends customer involvement in the development of the product. It also encourages convenient methods for customers to obtain information about the tests and evaluation of customer satisfaction.

CAS statement in the audit material:

CAS communicates with customers in a variety of ways as is evidenced by the documentation provided. Candidates may also contact the CAS Office directly with questions or concerns.

CAS Documentation:

Items sent directly to CAS candidates (and available on the CAS Web Site)

Syllabus of Examinations (including application and order forms)

Future Fellows newsletter

The Actuarial Review newsletter

Notice of Examinations (In Spring 2001 will only be available on the Web Site)

Items available on the CAS Web Site

Career Information: www.BeAnActuary.org

Students' Corner of the CAS Web Site

Candidate Feedback

Examination Surveys

Syllabus Surveys

Student Discussion Forum (on the CAS Web Site)

Auditor Findings:

The auditors found that CAS has good communication with and customer service for the prospective examinees. The auditors also noted that the surveys developed by CAS provide support for its active approach to customer service. The Chauncey audit team made no recommendations other than that CAS continue its sound policies of customer service.

Fairness

The Fairness chapter emphasizes standards that guide the development and administration of tests in ways that treat people equally and fairly. Differences in personal characteristics such as gender or ethnicity should not be relevant to the interpretation of the CAS test results. The standards include expectations that participation by various group members in the testing process and review of the tests for appropriate language will be documented.

CAS statement in the audit material:

CAS Examinations are open to any student. There are no prohibitions for sitting for an examination unless as the result of disciplinary action.

In the grading process, Candidate Number only identifies candidates. Similarly, any appeal is “blinded” and is resolved by the Examination Committee without knowledge of the individual making the appeal.

There is sensitivity to candidates taking examinations outside the United States. Editorial conventions (cf. *Examination Committee Procedures Manual*, page 34) dictate that question writers must “not use terminology (e.g., sports terms) or conventions (e.g., 1/3/00 for January 3, 2000) that may be unfamiliar or have a different meaning to foreign candidates. Use the full date in questions.”

CAS Documentation:

Editorial Conventions/Question Design

Auditor Findings :

Because membership in the examination committee is self-selection, it is not certain whether all of the various subgroups are represented. The auditors recommend that candidate background information be collected so that appropriateness of committee composition can be documented. Collecting the background data will also enable the analysis of the test items for Differential Item Functioning (DIF). DIF permits the examination of test items that might be influenced by features that would not be related to actuarial knowledge.

The auditors commended CAS’ guidelines on the use of inappropriate terminology in program publications. They suggested that an independent review of the tests for wording and balance of group references be conducted prior to printing the test booklets.

Uses and Protection of Information

The standards in this chapter address the need for CAS to maintain critical information safely, to ensure that confidential information is kept confidential, and to publicize information appropriately. Included in this chapter is the expectation that users of the CAS examinations will receive sufficient information to determine their value to them and their organizations. It also addresses the necessary procedures to maintain confidential, secure, and mission-critical information, including disaster recovery requirements.

CAS statement in the audit material:

Any Part examination passed by a candidate is considered public knowledge and is published by the CAS. Other information is generally not disclosed without the candidate's permission with the following exception: The CAS may, at its sole discretion, disclose to any other bona fide actuarial organization having a legitimate interest, information on the identity of candidates determined to have committed a serious examination violation (those for which the penalty is greater than the simple disqualification/nullification of the examination), and the specific penalties imposed on those candidates. Candidates are required to sign the following statement on each exam application: "I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them. I also agree that the results of any examination(s) which I take, and any action taken as a result of my conduct may, at the sole discretion of the Casualty Actuarial Society [and/or the Society of Actuaries for jointly administered Exams 1-4], be disclosed to any other bona fide actuarial organization that has a legitimate interest in such results and/or actions."

The CAS also publishes the examinations with answers and sample solutions for essay questions. The primary purpose is to help candidates to study for future examinations, but would also address the aspect of providing information to the public for evaluation. The CAS provides surveys for individuals taking the examination (as demonstrated in Chapter 3).

CAS Documentation:

Candidate Surveys

Auditor Findings :

The auditors commented that, for the most part, CAS has sound procedures for maintaining its information appropriately. They raised a question about the practice of publishing the list of those who are successful from the perspective of those who are not. If a person's name does not appear but his or her colleagues know that he or she sat for the examination, it is obvious that the person did not pass. The auditors recommended that CAS ensure the privacy of the failing candidates. CAS representatives indicated that such an inference is only one that may be drawn.

Validity

The validity chapter provides detailed standards on the need to provide evidence that the tests support the intended inferences and actions taken based on the reported results. The purpose of the test and the interpretation of the test results should be clearly stated and a rationale for each of the components should be clearly articulated. The standards also address the need to update the test objectives periodically and to provide potential users guidance on appropriate use of the information and admonition on possible misuses.

CAS statement in the audit material:

This section covers both the syllabus and exam functions.

CAS Documentation:

CAS Learning Objectives

CAS Syllabus Committee Manual

Exam Blueprints

CAS Examination Committee Procedures Manual

Overview of the CAS Examination Committee

The *Examination Committee Procedures Manual* contains information about determining the pass mark.

How is the Pass Mark Set? *Future Fellows*, December 2000, 6 (4), 3.

Auditor Findings:

The purpose of the CAS examinations is to measure a candidate's level of knowledge and understanding of the casualty actuarial topics as documented in the readings associated with each module. Although much of the information provided to the auditors alludes to this objective, the links to this are not overtly articulated.

The auditors recommendations centered around the need to create consistent test blueprints that incorporate the learning objectives and the knowledge associated with the objectives in each one. Likewise it is recommended that the readings be linked to the learning objectives in a formal process and the learning objectives should also be linked to critical aspects of the actuarial job. It was further recommended that, rather than keeping the blueprints confidential, they should be widely disseminated—to test candidates, to question-writers, and to users of the test, such as employers who support the candidates' efforts. This dissemination of the blueprints is expected to encourage the item-writers to generate test items that measure the candidate's ability to use the information provided in the readings rather than to memorize random facts from the readings. It is also expected that the candidates will benefit from increased information on how to prepare for the tests.

CAS Actions:

It should be noted that CAS has contracted with Chauncey to start this formal process. Chauncey staff have facilitated two sessions on learning objectives and plan to conduct the others in a timely fashion. CAS has also formed a task force related to this issue and is considering ways to formalize the linkage to actuarial jobs based on a job analysis methodology.

Assessment Development

The Assessment Development standards concentrate on the manner in which tests are developed. The documentation of the processes, including consultation and evaluation from diverse individuals, is central to the standards. The process must support the requirements for a valid, reliable assessment, including sound statistical analysis following the administration of the test.

CAS statement in the audit material:

Information on assessment development is contained in the *CAS Examination Committee Procedures Manual*.

CAS Documentation:

CAS Examination Committee Procedures Manual
Overview of the CAS Examination Committee

Auditor Findings:

The auditors recommended that item-writing training be given following the revision of the test blueprint. This training would seek to impart a method of writing questions that measure comprehension and application. The auditors also recommended that the use of True-False questions be discontinued since those do not measure the higher levels of application and comprehension. The auditors indicated that the item analysis that CAS prepares after the test administration is satisfactory. However, the auditors suggested that consistent statistical flagging criteria be developed in order to make better use of the statistical information generated.

CAS Actions:

CAS has moved forward on this recommendation by contracting with the Chauncey Group to conduct such training. The workshops will be scheduled once the learning objectives have been developed.

Reliability

The purpose of this chapter is to confirm that testing programs use appropriate procedures for calculating and reporting the reliability of the tests. Reliability is defined as the degree to which test scores from a group of test takers are consistent and dependable, thus repeatable from the individual test-taker's perspective.

CAS statement in the audit material:

Information on reliability is contained in the *CAS Examination Committee Procedures Manual* and can be discussed with the Examination Committee chairperson.

CAS Documentation:

(No documentation for individual test titles was provided.)

Auditor Findings:

Because no documentation regarding any reliability analyses was presented, the auditors recommendations were very specific. They suggested that CAS conduct reliability analyses following each Part Examination administration for the total decision score and for each of the reported sub-scores. These reliability analyses should also address the total decision score with regard to the consistency of passing and failing the same candidates as if they were to retake the examination. The auditors also recommended the calculation of the standard errors of measurement for the entire reporting scale and for the area of the reporting scale surrounding the cut score. Standard errors of measurement show the amount of fluctuation in a score due to factors not related to the test itself.

The auditors also suggested that the current tables provided in the Statistical History of Pass Scores be expanded to include measures of variability, such as standard deviations, and correlations among the sub-scores.

CAS Actions:

Members of the Examination Committee met with a member of The Chauncey Group Research and Measurement department to discuss various statistical analyses that would be useful. These discussions included formulas and/or processes for determining both internal consistency reliability measures and pass-fail reliability. CAS will make use of this information as it updates its item and test analysis software.

Cut Scores, Scaling, Equating

The focus of the standards in this chapter is the manner in which scores are determined and are reported. If the result of the test is a pass/fail decision, then the cut score process should be rational, clearly described, and well documented. The participants in a cut score study should be trained and the decision-makers should be apprised of the results of the study and the possible adjustments to be made. The reporting scale should be such that it is easily interpreted, difficult to misinterpret, and permit appropriate comparability among test forms. Equating refers to a statistical process that adjusts scores on two or more forms of a test so that the scores may be used interchangeably. Scaling refers to the conversion of the test-takers' raw score to the reported score.

CAS statement in the audit material:

Information on cut scores, scaling, and equating is contained in the *CAS Examination Committee Procedures Manual* and can be discussed with the Examination Committee chairperson.

CAS Documentation:

CAS Examination Committee Procedures Manual
How is the Pass Mark Set? *Future Fellows*, December 2000, 6 (4), 3.

Auditor Findings:

The auditors expressed serious concern that the current approach used for establishing the passing score requires several assumptions to be made:

1. The content covered each year is constant.
2. The test taking population is exactly the same in terms of level of preparation.
3. The readings offered for candidate preparation have not changed.

Given that none of these assumptions can be guaranteed, the auditors recommended a formal cut score study be performed and then a technique for equating future forms be established. One suggestion is that some of the questions be held back and not be published so that they may be used for the equating process.

CAS Actions:

CAS has already discussed the recommendations set out by the audit team. In October, two cut score studies were conducted for the fall examinations.

CAS has held discussions about the value of implementing an equating strategy. The auditors recommend not publishing all of the questions so that an equating block can be established. Current thinking on the part of the CAS examination committees is that this action would not be possible so an alternate strategy should be identified. Perhaps the cut score study process can be used to maintain the standard from year-to-year rather than using statistically based, common-item equating.

Assessment Administration

The standards in this chapter address how tests are administered, focusing on standardized and published procedures for candidate registration, supervisor and proctor activities, and security of test materials at the test site.

CAS statement in the audit material:

The CAS *Syllabus of Examinations* contains a detailed section about the administration of examinations (cf. pages 6 – 17). The *Notice of Examinations* contains reminders about key elements.

Grades are mailed in envelopes marked “CONFIDENTIAL” to candidates. When lists of passing Candidate ID Numbers are posted on the CAS Web Site, only the candidate knows his or her Candidate ID Number. To preserve candidate confidentiality, in the event of a lost or misplaced Candidate ID Number, the Candidate ID Number will be mailed to the candidate upon request. Under no circumstance is a candidate number given over the telephone.

CAS Documentation:

Confirmation form that is sent to each candidate who registers.
Proctor Instructions that are used by each proctor to ensure consistency at each exam site.

Auditor Findings:

The auditors’ review of the administration manuals found them to be complete and appropriate. No recommendations were necessary because CAS meets these standards well.

Reporting of Assessment Results

The purpose of this chapter is to guide the provision of correct and understandable scores and interpretive information about the scores to the test-taker and any other user group. It is important to provide scores in such a way that misinterpretation is avoided.

CAS statement in the audit material:

(No specific remarks were made for this chapter.)

CAS Documentation:

Sample of a pass grade report

Sample of a failing grade report with exam analysis

Sample of Pass Mark release [Note: This is a new policy with the first distribution in this format occurring in January, 2001.]

Auditor Findings:

CAS provides question-by-question feedback to the test taker. Although this form of feedback is desirable from the test-taker's perspective, the auditors raised the question whether test-takers may assume that learning the correct answers to the set of questions missed previously will assure success on a future examination. The auditors recommend providing sub-score level feedback so that failing candidates will approach the learning from the content level rather than from the test question level. Sub-scores are generally based on a group of related content topics as identified by the test specifications. It should be noted that such feedback is only valuable when the sub-score contains enough questions to provide reliable information to the test taker.

Assessment Use

The standards in this chapter focus on the need for the reporting organization to make sure that users understand the appropriate use of scores. CAS, as the reporting organization, should provide information about how to use the test information and should caution users to avoid potential misuses. For example, the goal of the CAS tests is to measure knowledge on specific topics associated with each of the parts. Telling successful candidates on Part 5 that they will find Part 6 easy to pass would be an example of misuse.

CAS statement in the audit material:

Information on the CAS Course on Professionalism: Those who are eligible (have completed five or more exams) are sent information on the CAS Course on Professionalism to prepare for membership in the CAS.

CAS Documentation:

“Passing Candidates”: The CAS publishes a list of the names of candidates who have passed CAS examinations. This is considered public knowledge. This information is also available on the Web Site.

Auditor Findings:

The auditors report indicates that the purpose of the tests is published widely. They recommend that CAS be mindful of the potential for misuse, particularly with employment. Employers should be reminded that success on the examinations is only a partial measure of success on the job.

Test Takers' Rights and Responsibilities

Test takers have the right to respectful and impartial treatment. They should have the opportunity to register complaints if they take issue with the tests or the administration process. Test takers also have certain responsibilities, such as appropriate behavior at the test centers. They should be informed of these rights and responsibilities throughout the testing process.

CAS statement in the audit material:

All rights and responsibilities are contained in the *CAS Syllabus of Examinations*. As indicated in Chapter 5, the candidates signed the following statement with each exam application: "I have read the rules and regulations concerning the examination(s) for which I am applying and agree to be bound by them..."

CAS Documentation:

CAS Syllabus of Examinations.

Auditor Findings

The auditors found that the procedures appear to be fair and adequately explained to candidates. The CAS is to be commended for the information provided in the Examination Rules chapter of the *Syllabus of Examinations*.