

ALL YOU WANTED TO KNOW ABOUT ASQ CERTIFICATION EXAMS

American Society for Quality (ASQ) Toronto section has distinguished itself as the section that witnesses maximum number of candidates appearing for the certification exams. The number of CQE candidates has gone beyond any record set any where else globally.

With so much interest in ASQ certification, there are also numerous questions about the exams from those interested to obtain one of these certifications. Sometimes there are questions from the candidates who do not make it through the examinations on the legitimacy of the examinations. To be specific: how these exams are developed, and how the pass/fail point is determined. This article is meant for all those who are interested to know about the development and evaluation of ASQ certification exams and how to increase your success rate in any such certification examination.

An overview of the process of development and evaluation of any ASQ examination is given in the process flow chart attached to this article.

About ASQ certification exams in general

ASQ certification examinations are different from any typical university or college examination on a subject. They are designed to test an individual's knowledge of a given body of knowledge to judge whether a certificate could be awarded to that individual in that specific category of certified quality professionals. These exams are not all that complex but are unique in the following:

a) **The body of knowledge** for ASQ exams (like CQE) covers a wide variety of topics that are drawn from several text books, and there is no prescribed course, even though there are many agencies that offer courses.

In the case of a typical university subject exam, the volume of topics covered is much more focused, and there is a prescribed course at the university with term exams, exercises, and project work etc., that build clarity of concepts and knowledge of applying those concepts through problem solving exercises and discussions in the class and among classmates. The fact that this type of prescribed learning is typically not available for ASQ examinations makes the examinations a bit tough for many candidates.

b) **Exam questions:** The questions in the CQE certification exam are only multiple choice questions and test mostly the conceptual clarity and general applied knowledge of various subjects in the body of knowledge. The majority of these questions really do not require detailed calculations. In fact over the years the number of questions with very complex calculations or time-intensive problem solving has been reduced significantly for the CQE certification exam. This change is largely the result of technological innovation. Up to a few years back the CQE exam was an all day test with two exams of 3 hours each (forenoon and afternoon) and candidates had to do complex calculations.

c) **The time factor:** Many candidates complain that the number of questions in ASQ examinations and the time allowed to do the exam limit the amount of time you can spend on any question to less than two minutes. Perhaps a better way to look at this challenge is to realize that a quality practitioner is quite experienced with a variety of quality tools and techniques and is able to remember those quality concepts including the nuances of applications of these concepts and thus is able to answer many of the certification examination questions in less than a minute. Of course some of the more complex questions may take as much as 5 minutes or more to calculate or to make up your mind in choosing, which of the options is the best fit when faced with choices that are quite close. It is important to remember that the calculated amount of time per question is only a mean, and, as any quality professional can tell you, that figure doesn't factor in the range or variation from the mean.

d) Criteria for registering for an ASQ exam: A candidate registering for any ASQ certification exam is required to have a combination of educational qualification and practical experience in the field of quality.

The process of developing certification examination questions

It is a long and costly process for ASQ that involves several hundred hours of work by teams of certified professionals attending various sessions. The key workshops involved in the exam development process are (a) Job Analysis Workshop, (b) Test Specification Workshop, (c) Item Writing, (d) Item Review (e) Exam Review. Participants for every session are to read details of the process and relevant details as preparation before every workshop.

(a) **Job Analysis Workshop:** This workshop of 12 Subject Matter Experts (SMEs) results in setting the foundation for the Job Analysis Survey. The survey is mailed to about 2000 SMEs in that field (irrespective of ASQ membership) to determine what knowledge and skills are appropriate to test for the specific certification exam.

(b) **Test Specification Workshop:** The tasks and knowledge areas obtained from job analysis are then assembled into an outline format with topics and categories that logically group to form Body of Knowledge (BOK) for the specific certification category. The SMEs then develop explanatory subtext that clearly describes the particulars of each subtopic. The number of questions and the time limit for taking the exam are also determined at this workshop.

(c) **Item Writing Workshop:** In this workshop 24 SMEs who are trained in item writing develop question items in small groups. Each item (*assessment professionals use this term instead of question*) that is developed in this session must have the following:

- Only 1 key (correct answer) that must have team agreement.
- A reference to support the key.
- A rationale for the item which explains what the item is testing and why the key is correct and the other options are not.
- Classification to the most detailed level of the BOK.

Item writing workshops typically produce 200-300 items over a two day period. The items produced are considered 'raw' and will be reviewed by another group of SMEs at an Item Review Workshop.

(d) **Item Review Workshop:** About 4 weeks before the meeting, the twelve SMEs are sent the items to be reviewed in the workshop. They answer the items as if they were candidates sitting for the exam. While they review the items they are expected to make comments about them and submit those comments to the ASQ test developer. The comments from all SMEs are then compiled into one document, which is used for item review workshop. The SMEs attending this workshop are trained in a variety of assessment issues. Their focus is to review the items to ensure that there is only one key and that the item is clearly written and accurate. They also confirm the reference and rationale for each item. Once all components of the item are verified the item is approved and can subsequently be selected for use in an exam.

(e) **Exam-Review Workshop:** Once the raw items are reviewed and approved, the ASQ test developer creates a draft exam in accordance with the test specifications, and reviews it for overlap or cueing between items. The 12 SMEs attending this workshop take the exam just as any candidate would. As in the case of Item Review discussed above, they are asked to comment on the items and send those comments to ASQ Test Developer. At the workshop the members are trained in a variety of assessment issues and then asked to focus on items identified as "problematic" from the review prior to the workshop. Once all the issues in the exam are resolved, the committee approves the exam and it can then be used for test administration.

The process of determining a passing grade

Whenever an exam is administered with a new body of knowledge, the exam is subjected to a cut score process. A group of 12-14 certified professionals (other than those who were involved in developing the questions or reviewing the exam) is asked to rate each question in the new exam in terms of difficulty for a minimally qualified examinee or candidate. In other words the team is asked "What % of minimally qualified candidates for the exam will get this question correct?" The cut score study participants consider many factors such as the basic or advanced level of knowledge required to know the right answer, any potential errors a candidate can make because of the various choices given, the way the question is presented (including the use of English language styles and words), etc. Whenever members of the cut score panel show an expected performance score that is more than 25 points apart from other panel's rating, the difficulty factors for that question are debated and discussed until a consensus is reached by the group.

The final cut score developed by the cut score study panel is presented to the ASQ Certification Board as the recommended percent or portion correct needed to pass the test. See Appendix-B for a sample of the item statistics template exam stats template used for discussions during the cut score study and a sample summary table of what the ASQ Certification Board sees when determining the cut score of a new body of knowledge.

What is described above is a very brief description of the cut score process. I was a member of the cut score study panel for the CQA exam administered in June of this year, and this is the process we used to set the cut for that new body of knowledge. It is the same process ASQ uses on all of its exams.

Note:

The procedures ASQ uses to develop tests and establish pass point are in accordance with those described in the ANSI 17024 standard; these procedures are considered accepted practices as outlined in the *Standards for Educational and Psychological Testing*, which are developed by the American Educational Research Association, (AERA), the American Psychological Association (APA), and the National Council on Measurement in Education (NCME).

What really works for a candidate to ensure passing any ASQ certification exam?

Please note that points described below are my own personal recommendations on how to prepare to take and pass an ASQ exam. This is also based on my experience and the experience of others who shared them with me.

- a) Go through the body of knowledge booklet for the exam and get an idea of the topics.
- b) Identify your strength and weakness in terms of your depth of knowledge of the topic areas and check how comfortable you are answering some of the sample questions.
- c) Prepare for the exam by using a combination of the following (depending on your background and knowledge comfort level):

(i) **Self study using** CQE primer, reference books from the CQE bibliography etc.

The CQE primer developed by the Quality Council of Indiana presents over 600 pages of subject material collected from several books. This primer also contains a collection of 600 sample questions and answers that could be used as practice exams. (Note that that these primers are **not** developed by ASQ or in collaboration with ASQ; but they published by private companies.) Reference books from the Body of Knowledge (BOK) booklet for each certification (or through asq.org certification website) offer much more in-depth review of specific subject areas. After reviewing the body of knowledge booklet, the candidate will know which areas of the BOK are challenging. It is well worth the investment to acquire specific textbooks for these areas, because no primer or refresher course will give the necessary

depth of understanding possible through these sources. A good reference book is also a good investment.

(ii) **Taking college/university courses:** For candidates who find complex some topic areas (such as reliability engineering, or design of experiments) too tough to understand by self study, it is good to try some specific courses on that topic. Community colleges do have a number of such courses on many topics. The need for such courses would depend on your background and expertise. For candidates with good academic background and familiarity with statistical tools, this need would be very minimal. However, keep in mind that by passing a set of these college courses you cannot expect to just walk through the ASQ certification exams. These courses really help to a large extent. But coursework alone is not sufficient.

(iii) **Refresher courses:** There are a few refresher courses offered by senior quality professionals and just a few community colleges. Once you have completed the general preparation, it is a good idea to join any of the refresher courses to get a sound, overall review and opportunity for discussion on some of the more typical questions that are likely to show up on the exam. Many of the refresher courses offer tips on formulas, definitions, etc., and can be quite helpful to increase your confidence on tools that you don't use everyday in your work.

(iv) **Mock exams:** Using mock exams in the form of sample questions from various sources (primers, ASQ information bulletin, refresher course material, etc.) is a good way of exercising your brain and making it sharper for the actual the exam. Through several such mock exams it is also possible to identify common mistakes that you may make and develop strategies to guard against them during the actual exam.

How does our Toronto section perform in these ASQ exams?

a) Our section performance in the certification exams is generally within the $\pm 5\%$ of the global average. Sometimes our section performs better than global average and some times a bit worse. A total of 180 * candidates sat for the CQE exam this June in our section, and 67 passed; i.e., 37.2%. By comparison, 1,450 candidates sat for the exam globally and 610 of them passed; i.e., 42%. Our best performance for CQE in the last few years was 62%.

b) Several variables affecting the section performance in terms of % pass:

- the candidates' background knowledge/educational background
- practical experience in the field of quality to be specific the Body of Knowledge topics
- candidates' preparation for the exam
- performance during the long 5 hour exam with concentration and time management skills
- strategy used for identifying correct answers when several choices compete closely or where more in-depth knowledge is required.

Our section is continually pursuing possible initiatives, within our limitations, to help the candidates for getting certified. One thing we continue to do is to make information on professional certifications available to all interested parties through many ways, for example articles such as this, information posted at our web-site, and through the information desk provided exclusively for ASQ certifications at every monthly program meetings.

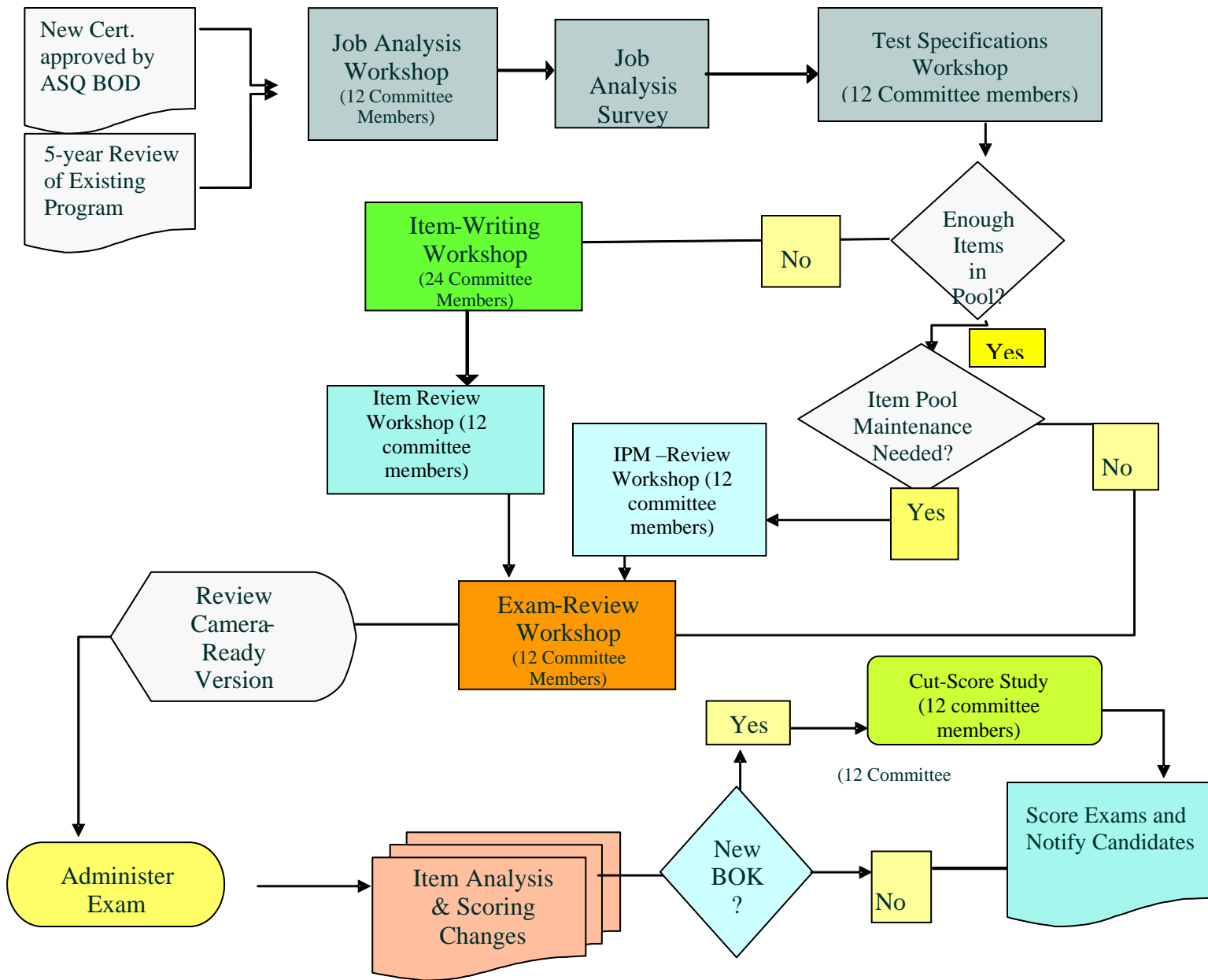
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Note: See Appendix A: Flowchart of Test Development

Appendix B: Sample table with the panel recommended cut and the Certification Board Decision

APPENDIX - A

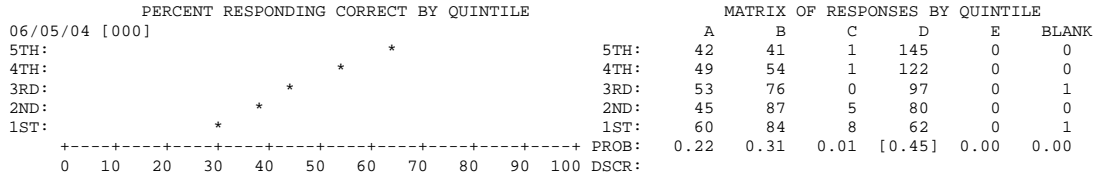
STEPS IN TEST DEVELOPMENT



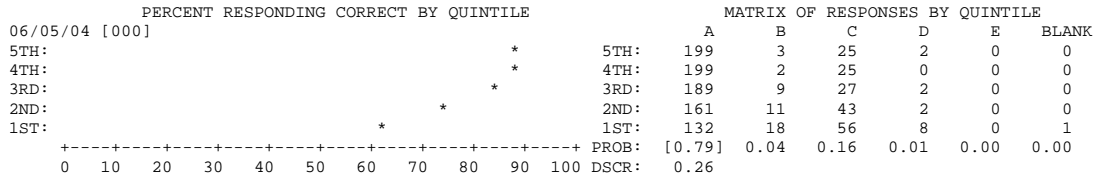
APPENDIX B

Sample templates of exam statistics

2 A 3



2 B 2



Sample table with the panel recommended cut and the Certification Board Decision

	-3 SEJ	-2 SEJ	-1 SEJ	PANEL- RECOMMENDED CUT	+1 SEJ	+2 SEJ	+3 SEJ
% of BOK	68.0%	71.1%	74.2%	77.2%	80.3%	83.4%	86.4%
# of Questions Correct	102	107	111	116	120	125	130
				TOTAL GROUP PASS RATE			
% of Passers	85.5%	77.0%	68.8%	55.6%	42.3%	26.6%	10.2%
# of Passers	1481	1334	1191	962	733	461	177

BEUK Score	
% Expected to Pass	80%
Cut Point (Raw Score) = 70% of BOK	105
# of Passers	1392