



How the National Knowledge Exam NKE is Developed and Scored

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Housekeeping

- Slides, archived webinar, and Q&A to be posted on HRPA website on the Office of the Registrar page within a week
- Time has been set aside for questions at the end of the webcast but you can submit your questions at any time
- All questions and their answers will be posted on the HRPA website

Today's Webinar

- Who does what with respect to the exam?
- Why does HRPA delegate the development and scoring of the exam to CCHRA?
- How is the NKE developed?
- How is the cut-score (passing score) set?
- How are the scores calculated?
- What is a manual rescore?

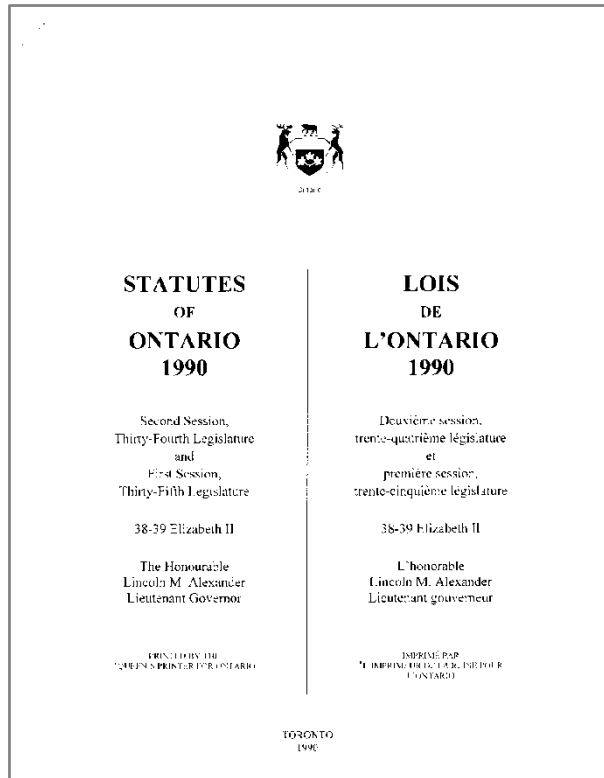
Exam Results

- The results for the October 2nd exams will be released in early December
- Instructions as to how and where to find the results have been sent by email to all exam-writers; they are also posted on the HRPAs website
- A follow up email, with more detail will be sent within a week after that

Brief History of Exam Requirement at HRP A

- HRP A introduced an exam requirement in 1994.
- The concern at the time was that there appeared to be significant differences in the quality of academic preparation across academic institutions despite the fact that that all courses met the same standards with respect to course content
- This exam was called the Comprehensive Provincial Exam (CPE).
- In 2003, the CPE was replaced by the National Knowledge Exam (NKE)

Statutory Authorities in Regards to the Exam Requirement



- Section 2(c) of the Act gives HRPAs the statutory authority to “*hold examinations and prescribe tests of competency deemed appropriate to qualify membership in and certification by the Association.*”
- Section 2(a) of the Act gives HRPAs the statutory authority to “*establish uniform province-wide standards of knowledge, experience and ethics for all persons engaged in the field of human resources management.*”

Delegation to CCHRA

- In Ontario, the knowledge exam are prescribed pursuant to statutory authorities delegated to HRPA
- HRPA delegates to CCHRA the task of developing and scoring the exams
- Delegation is not a transfer of authority or an abdication of responsibility, HRPA remains fully responsible and accountable for the exams that are developed and scored by CCHRA on its behalf

Delegation to CCHRA

- Why does HRPA delegate the development and scoring of the exams to CCHRA?
 1. To manage possible conflicts of interest
 2. To benefit from economies of scale
 3. To facilitate mutual recognition of designation

Reason #1: Conflict of Interest

- To reduce the possibility of self-serving manipulation of the cut-score or passing rate, and to increase public confidence in the process, standard setting is delegated to an arms-length body
- The standard is supposed to be set at the appropriate level to protect the public interest however in order to increase membership a regulator might be tempted to lower standards; on the other hand, to increase the demand for certified professionals a regulator might be tempted to restrict supply by raising the standards
- Using an external panel of psychometric experts to oversee the development and scoring of the exams reduces the risk of manipulation

Reason #2: Economies of Scale

- Developing exams is an expensive proposition
- It makes sense to amortize the cost of developing and scoring exams by joining with other associations that have the same need

Reason #3: Facilitates Mutual Recognition

- There is nothing that requires different provincial associations to use the same exam in order to make the designation transportable
- A national standard means comparable competence not identical process
- On the other hand, using the same exam does make comparability easier to establish

Who Does What in Regards to the Exam

HRPA Board

- Prescribes examinations
- Maintains oversight of the exams in Ontario
- Responsible and accountable for the examinations conducted pursuant to the CHRP in Ontario

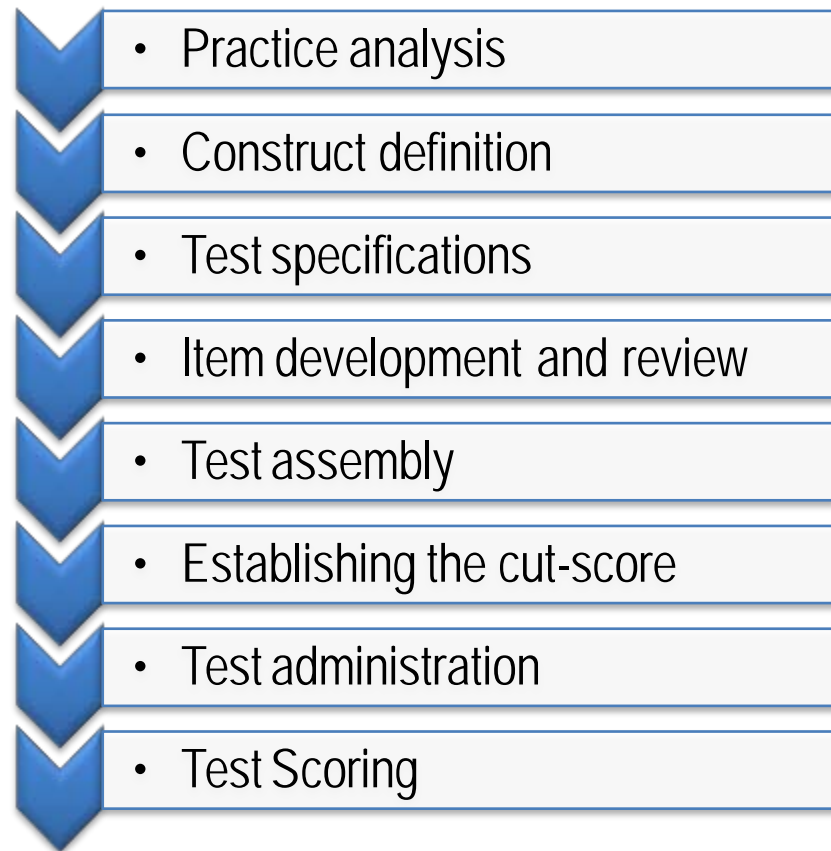
CCHRA

- Conducts practice analyses
- Develops exams
- Prints exams
- Proposes cut-score
- Scores exams

Registrar

- Manages exam registration
- Verifies eligibility to write exam
- Administers exams
- Trains proctors
- Communicates exam results
- Keeps records
- Educates members on examination process

Test Development Process



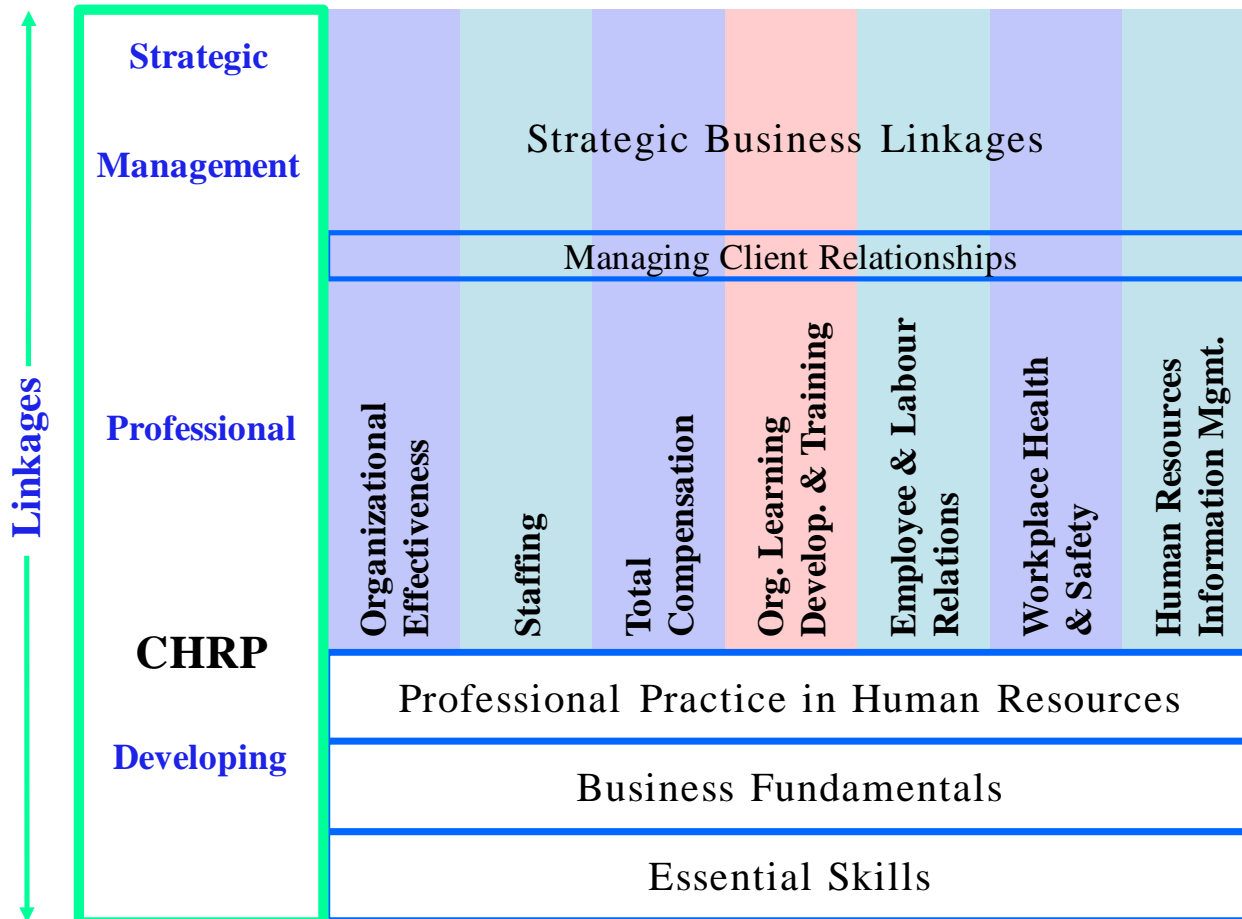
Practice Analysis

- A formal study of an occupation, the tasks accomplished as well as the knowledge, skills, abilities, and other characteristics needed to perform in that occupation
- Original practice analysis conducted in 1998, updated in 2007
- Optimally, practice analyses are updated every five years

Output of Practice Analysis

- The output of a practice analysis is a framework that describes what competent members of a profession must know and/or be able to do
- In HR in Canada, this framework is called '*The HR Body of Knowledge*' (although many refer to the framework as 'the RPCs[®]')

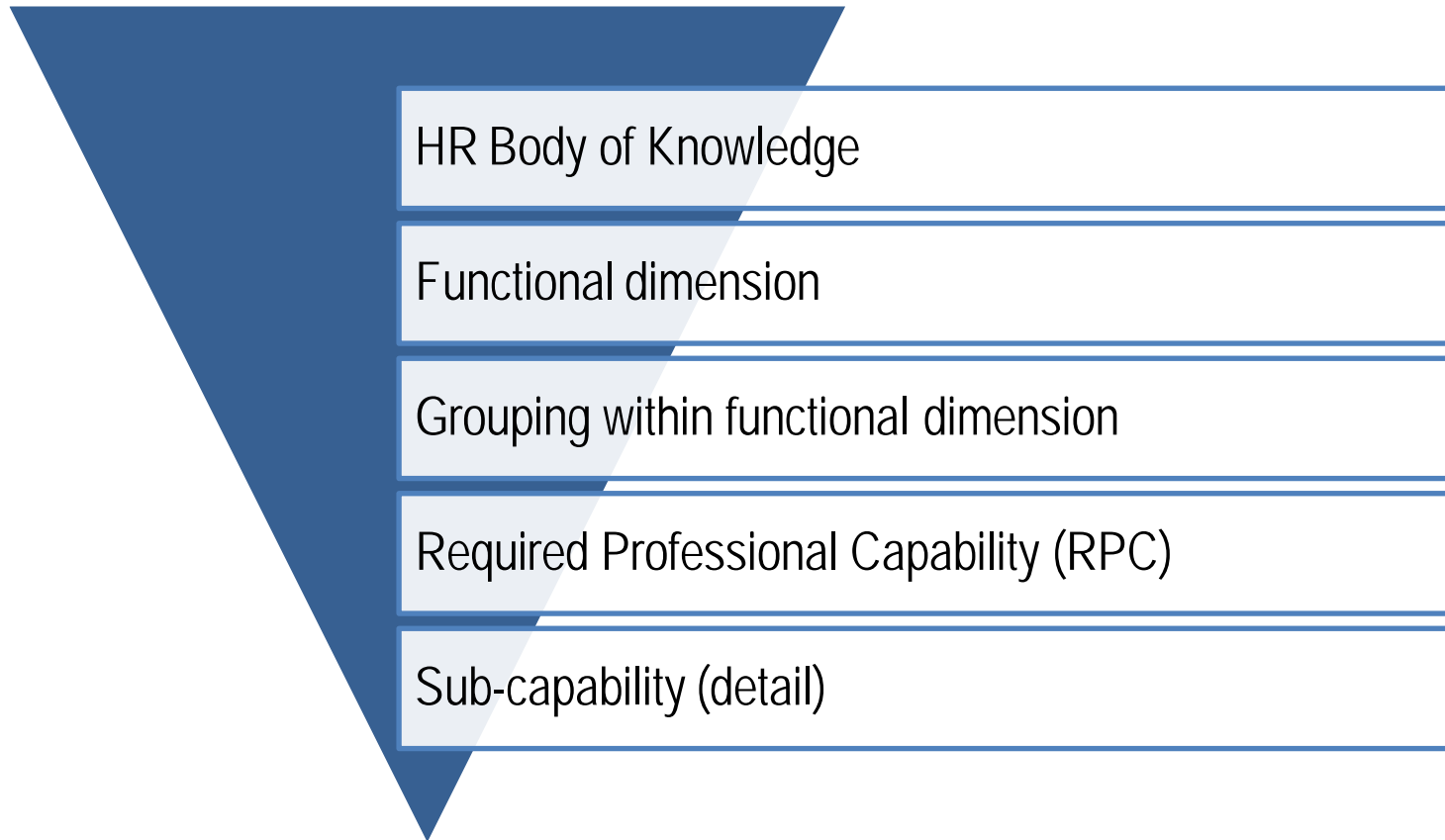
Human Resources Professional Capabilities Profile



The Seven Functional Domains

- Professional Practice in HR
- Organizational Effectiveness
- Staffing
- Employee and Labour Relations
- Total Compensation
- Organizational Learning, Training & Development
- Occupational Health & Safety

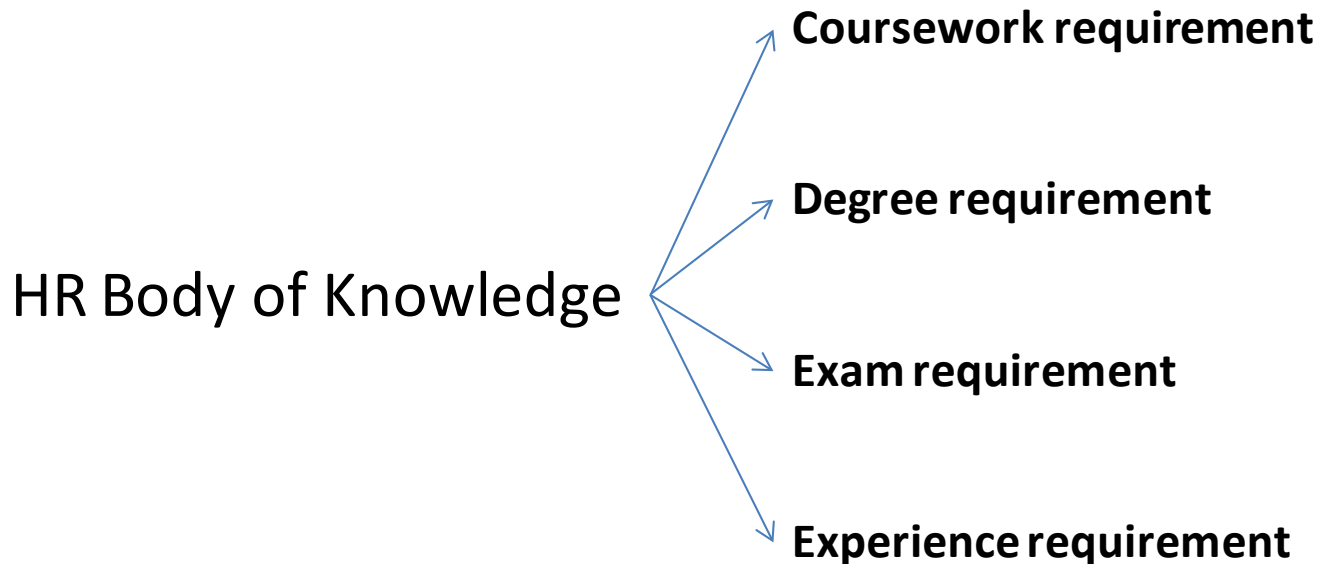
The HR Body of Knowledge



The HR Body of Knowledge

- The two most important levels in the hierarchy are the functional domains and the Required Professional Capabilities (RPCs®)
- The functional domains are important because this level is used to define the test specifications for the exams
- The Required Professional Capabilities (RPCs®) are important because they represent the most useful level to describe the individual competencies that every professional in HR should be able to understand and apply in the workplace
- The RPCs® are used to develop exam questions

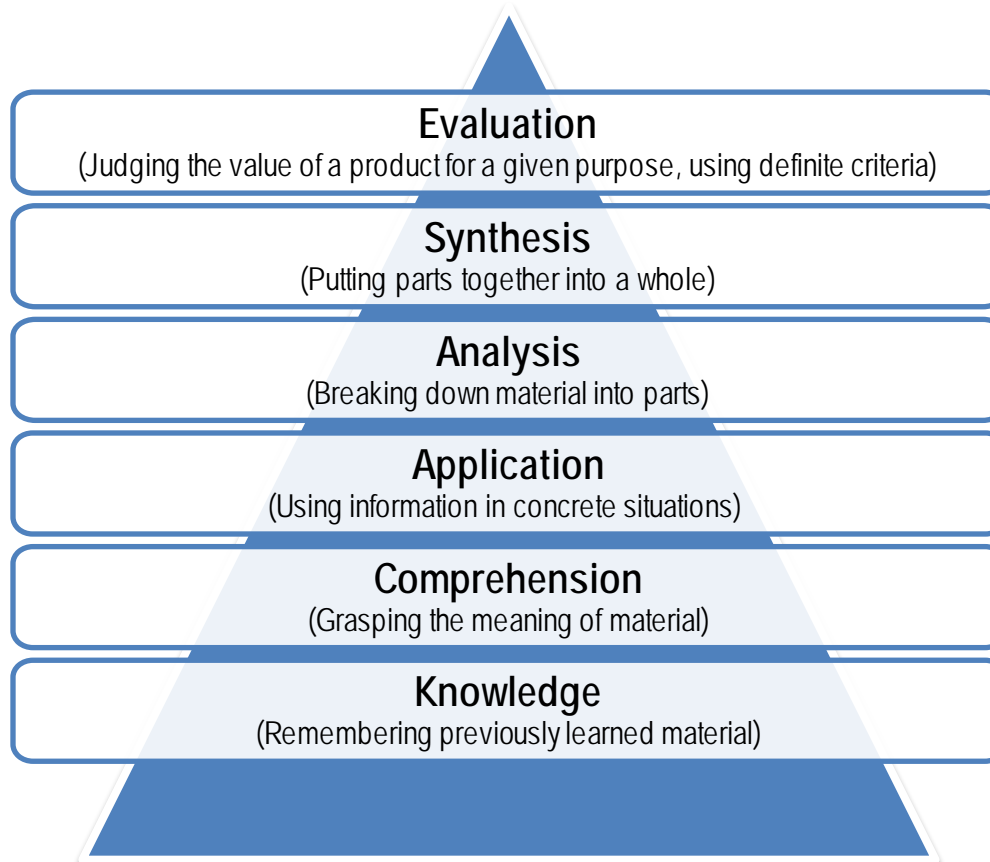
All Requirements Derive from the HR Body of Knowledge



Construct Definition

- To be precise, an exam is not a requirement, it is a method of assessment
- The real requirement is what the exam measures—what is measured is called the ‘construct’
- The exam is just a way of getting at a construct
- The construct measured by the NKE is ‘academic knowledge in HR’

Bloom's Taxonomy



Academic Knowledge

- **Academic knowledge** refers to basic facts, policies, practices, methods, legislation, etc. It is information that can be written into procedures and transferred fairly accurately during the learning process

Sorting the RPCs®

- The RPCs® were sorted into two categories those that were best understood as reflecting academic knowledge and those that were best understood as reflecting experiential knowledge
- The sorting of the RPCs® was accomplished using a rating included in the practice analysis

Sorting the RPCs®

What level of proficiency is needed to successfully carry out the RPC?

Rating	Anchor	Description
1.0	<i>Don't Know</i>	Respondent had no knowledge or experience with the RPC™
2.0	<i>Entry-Level Professional</i>	The RPC™ could be performed by new entrants to the HR field with no experience
3.0	<i>Developing Professional</i>	The RPC™ could be performed by developing professionals who could be expected to master the RPC™ through on-the-job experience or developmental/training programs
4.0	<i>Experienced Professional</i>	The RPC™ could be performed by professionals who had more training and experience

RPCs® with proficiency ratings of 3.22 or greater were deemed experiential RPCs® whereas those with proficiency ratings of 3.21 or less were deemed academic RPCs®.

Test Specifications

Content Domain	Total Number of RPCs®	Academic Knowledge		
		Number of Academic RPCs®	Percent of Academic RPCs®	Approximate Number of Questions on Exam
Professional Practice	42	24	25.0	38
Organizational Effectiveness	22	8	8.3	12
Staffing	30	18	18.8	28
Employee & Labour Relations	25	10	10.4	16
Total Compensation	25	10	10.4	16
Org. Learning & Training	26	18	18.8	28
Occupational Health & Safety	17	8	8.3	12
Total	187	96	100.0	150

Multiple-Choice Format

- Cost-efficient and effective
- Recall as opposed to production
- Well adapted for knowledge and application levels but can be developed to tap higher cognitive functioning

Item Writing

- Academics in the field of Human Resources Management (HRM) at Canadian universities and colleges are enlisted to write questions pertaining to their area of specialization using the knowledge RPCs[®] as starting point
- Items reviewed for clarity, grammar, and spelling by professional editor with HR editing experience
- Final review by CCHRA Exam Board

Translation

- Items are translated (from English into French) by a professional translator familiar with HR terminology and usage

Test Assembly

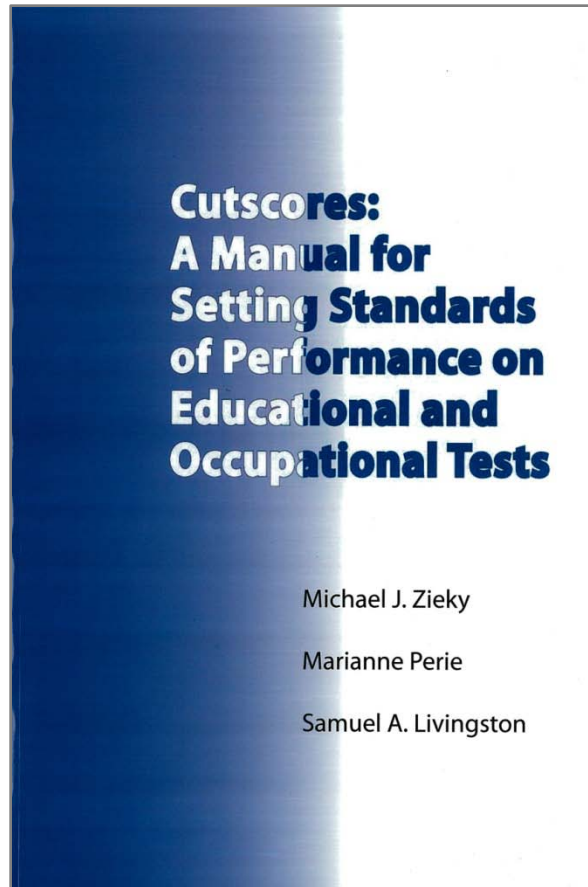
- From among the item pools, and respecting the test specifications, items are selected to make up a given form of the test
- Tests are printed
- Tests are shipped to the various provincial HR associations

Standard Setting

- Using the same specifications results in exams of similar difficulty, but there will always remain small differences in the difficulties of alternate forms of the exam
- For licensure and certification tests, the standard is absolute and not relative, which means that the cut-score represents the same level of proficiency from one form of the exam to another
- Different approaches have been developed to set cut-scores such that they reflect the same level of proficiency across different forms of an exam

No Quota or Targeted Pass Rate

- Exam-writers do not compete against each other; there is no pass or fail quota
- There is no targeted pass rate.
- If a particular group of exam-writers is strong, more exam-writers will pass the exam; if a particular group of exam-writers is weak, fewer exam-writers will pass the exam

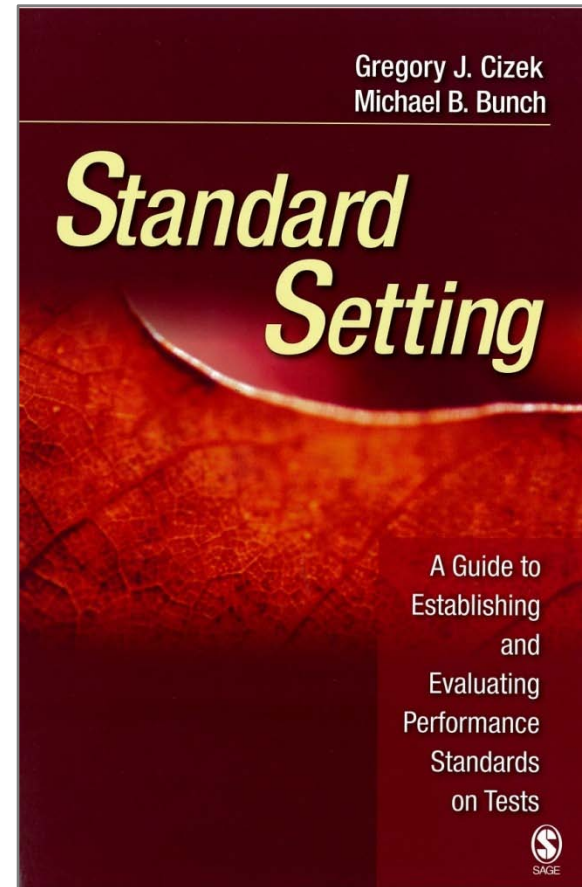


**Cutscores:
A Manual for
Setting Standards
of Performance on
Educational and
Occupational Tests**

Michael J. Zieky

Marianne Perie

Samuel A. Livingston



Gregory J. Cizek
Michael B. Bunch

***Standard
Setting***

A Guide to
Establishing
and
Evaluating
Performance
Standards
on Tests



Angoff Panels

- Starting with the October 2009 exam, CCHRA started using what are known as 'Angoff panels' to set the cut-scores for the exams
- An Angoff panel is a method which makes use of the combined judgment of panel members to establish the probability that a candidate at the threshold of competence would be able to answer the question correctly
- Angoff panels are made up of HR professionals who have a good handle on what is required of HR professionals
- Presently, Angoff panels are convened by CCHRA after the tests are assembled, but they can be conducted even before the tests are assembled

Angoff Panel Data

	Angoff Panel Judge					Across Judges	
	1	2	3	4	5	Average	Standard Deviation
Question 1	.75	.75	.80	.65	.70	.73	.057
Question 2	.65	.70	.75	.65	.80	.71	.065
Question 3	.70	.65	.60	.65	.65	.65	.035
Question 4	.65	.75	.65	.70	.60	.67	.057
Question 5	.55	.50	.45	.65	.55	.54	.074
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Question 146	.80	.80	.80	.70	.60	.74	.089
Question 147	.80	.75	.70	.55	.65	.69	.096
Question 148	.55	.60	.65	.65	.45	.58	.084
Question 149	.65	.65	.70	.75	.65	.68	.045
Question 150	.65	.70	.65	.65	.55	.64	.055
Passing score	101.25	102.75	101.25	99	93	99.45	3.846

Fixed and Floating Cut-Scores

- The cut-score is determined before the test is administered or scored (but can still change depending on the outcome of the post-exam item review)
- Because the cut-score for the test is derived by adding the probabilities for each question, the cut-score will vary depending on the particular set of items that make up the test
- Each version of the exams will have its own cut-score
- An exam that is made up of somewhat more difficult questions will have a somewhat lower cut-score; an exam that is made up of somewhat easier questions will have a somewhat higher cut-score

Fixed and Floating Cut-Scores

- In the past, the cut-score for the exam was set at 70%, and adjustments were made to the scores to make this work
- Advice from experts in psychometrics was that it was better to leave the scores alone but to set the cut-score accordingly
- Going forward, instead of adjusting the scores, the cut-score will be allowed to vary based on the relative difficulty of the exam based on the Angoff panel ratings
- Allowing the cut-score to vary obviates the need to make adjustments

Floating Cut-Scores vs. Adjustments

- In October 2009, in order to keep the cut-score at a fixed 70%, the adjustment was +14 for the NKE and +3 for the NPPA
- This is equivalent to a cut-score of 91 out of 150 or 60.6% for the NKE and 39 out of 60 or 65.0% for the NPPA
- Going forward, instead of adjusting the scores, the cut-score will be allowed to vary based on the Angoff panel ratings

Switching to Floating Cut-Scores

- The switch to a floating cut-score
 - makes no difference in terms of how one would prepare for the exam
 - makes no difference in terms of test-taking strategy
 - makes no difference in terms of whether one passes or fails the exam
- The switch to a floating cut-score makes the scoring more transparent and is consistent with best practices in testing

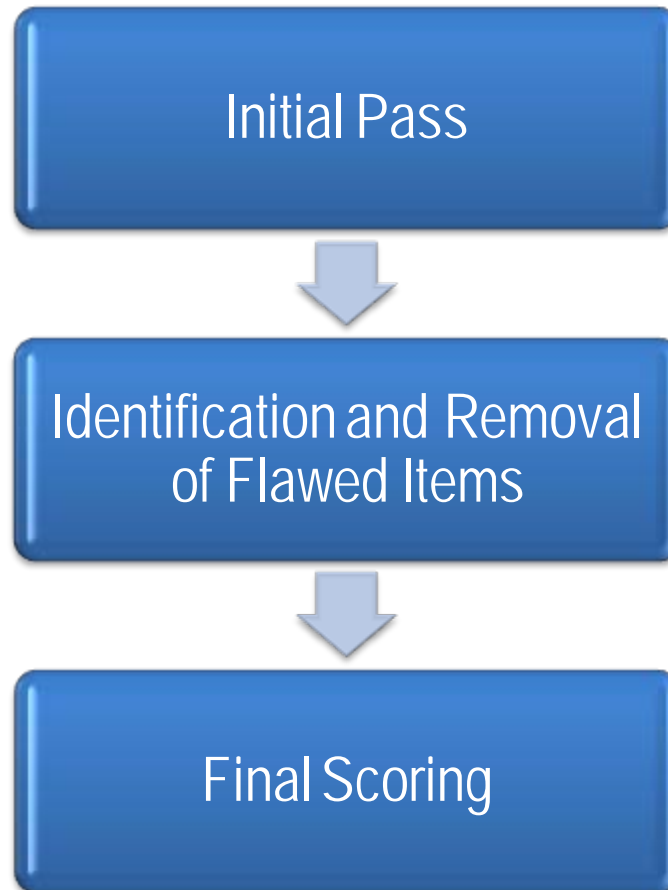
Scoring the Exams

- Scoring the exams is a multi-step process
- There is an initial scoring of the exam based on all the administered items. The purpose of this initial scoring is to identify flawed items
- There is a post-exam review where items that may be flawed are reviewed to determine whether they are truly flawed or not
- There is a final scoring where the scores and the cut-score are recalculated based on retained items. The purpose of this final scoring is to assign a score to exam-writers

Scanning the Answer Sheets

- The Scantron® sheets are scanned
- The Scantron® reader flag response sheets with missing (omits) or multiple responses
- These response sheets are reviewed individually

Scoring the Exams



Post-Exam Review

- Despite the care and attention that is given in developing items, some items can fail to perform as expected
- In a post-exam review, the performance of each item is examined statistically by conducting what is called an ‘item analysis’
- Item analysis identifies ‘non-performing’ items
- Non-performing items are usually flawed items
- Flawed items reduce the validity and reliability of the exams and should be discarded

Example of a Flawed Item

Which of the following cities is the capital of Ontario?

- a. Montreal
- b. Ottawa
- c. Saskatoon
- d. Edmonton

What is an Ambiguous Item?

- It is not uncommon for exam-writers to feel that some of the items were ambiguous
- Psychometricians have ways of identifying ‘non-performing’ or flawed items
- The statistics calculated for each question include item difficulty and discrimination indices
- In the context of item analysis, the discrimination index refers to the statistical correlation between performance on the item and performance on the exam as a whole
- In addition, difficulty indices are calculated for candidates at varying levels of overall exam performance, as well as for each linguistic version of the exam
- The pattern of responses across incorrect options (‘distractors’) is also examined

Final Scoring

- Items deemed ‘flawed’ are removed
- The scores are re-calculated based on the retained items
- The cut-score is also recalculated based on the Angoff panel ratings for the retained items
- The final score and the final cut-score may be based on less than the full number of items
- This represents the ‘definitive’ scoring of the exam

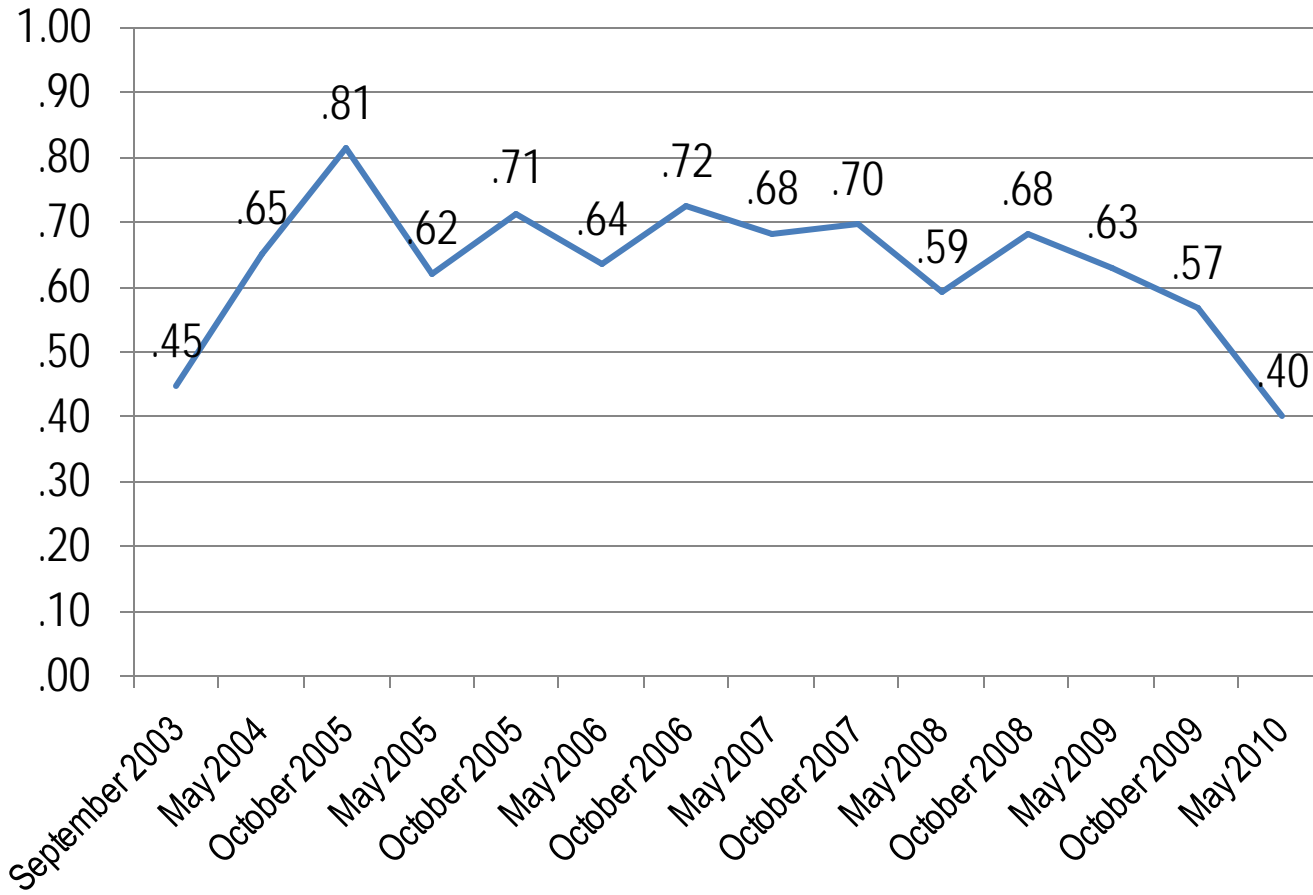
Rounding

- The scores, and the cut-score are reported in terms of percentages
- Final scores at or above the final cut-score are 'passes'; final scores below the final cut-score are 'fails'
- We want to avoid having two candidates with the same percentage score where one passes while the other fails
- Therefore, if two raw scores equal the same rounded percentage cut score, we use the lower of the two

Manual Rescores

- Despite the quality control procedures, it remains possible that a error could have been made in the scoring of an exam
- Upon request and payment of a fee, CCHRA will conduct a manual rescore of the exam
- A manual rescore is just that, starting with the Scantron[®] sheet, the exam is rescored by hand
- The CCHRA fee for manual rescores is \$25
- For HRPAs exam-writers, all requests for manual rescores must be made to HRPAs

NKE Pass Rate



NCCA Accreditation

- In all its exam processes, HRPAs strives to meet or surpass NCCA accreditation standards
- For more on NCCA accreditation standards
<http://www.credentialingexcellence.org/AccreditationServices/CertificationAccreditation/StandardsInterpretations/tabid/93/Default.aspx>

Interested in Knowing More?

- *Various. (2009). Certification: The ICE Handbook* J. Knapp, L. Anderson, and C. Wild (Eds.), The Institute for Credentialing Excellence, Washington, DC.
- Cizek, G. J., & Bunch, M. B. (2007). *Standard setting: A guide to establishing and evaluating performance standards on tests*. Sage: Thousand Oaks, CA.
- Zieky, M. J., Perie, M., & Livingston, S. A. (2008). *Cutscores: A manual for setting standards of performance on educational and occupational tests*. Educational Testing Service: Princeton, NJ.
- Haladyna, T. M. (2004). *Developing and validating multiple-choice test items*. (3rd Ed.). Lawrence Erlbaum Associates: Mahwah, NJ.
- National Commission for Certifying Agencies (2004). *Standards for the accreditation of certification programs*. Author: Washington, DC.



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