Willing and Able to Think Critically?

Assess Critical Thinking Mindset with the CCTDI and Skills with the CCTST

California Critical Thinking Disposition Inventory

Companion to the

California Critical Thinking Skills Test
Technical consultation is available through Insight Assessment.
Phone 650.697.5628
Fax 650.692.0141
Published by Insight Assessment, a Division of the California Academic Press
www.insightassessment.com
Ethics of Performance Testing

Use, administration, scoring, and interpretation of the assessment tools published by the California Academic Press is the sole responsibility of the purchaser and user. Insight Assessment strongly recommends that persons using these testing tools observe ethical, academic, and professional standards in the use, administration, scoring, and interpretation of these instruments.


Priority of the Current Update

This update supersedes all earlier versions of this assessment manual with or without ISBN numbers and all informational materials as may have been published on the Internet or in any other form or media by Insight Assessment / the California Academic Press regarding the assessment instrument(s) supported by this manual. In the event of discrepancies or inconsistencies between any earlier version of this manual or any other materials published by Insight Assessment / the California Academic Press and the current edition of this assessment manual, the information in the current edition of this manual should be given priority.

Complimentary Update

All Insight Assessment customers in good standing who have purchased single use licenses for the assessment instrument(s) this user manual supports are invited to request a complimentary PDF of the most updated version of this user manual at any time. To receive your updated copy of this manual, phone Insight Assessment at 650-697-5628 or email us at support@insightassessment.com

User Manual Editor and Project Director: Dee August
Content Management and Web Coordination: Kathryn Winterhalter
Design: James Morante
Images, Citations and Photos Credits: In addition to text and images developed by Insight Assessment, the assessment authors, or in the public domain, we acknowledge with gratitude the citations, photos and images that appear in this manual from Microsoft Exchange, Wikipedia Commons, and Measured Reasons LLC.

© 2016 by Insight Assessment / California Academic Press, San Jose, CA, 95112. All rights reserved. Printed in the United States of America. This document is protected by Copyright. Contact Insight Assessment to seek permission prior to reproducing or transmitting this publication of this assessment manual in whole or in part.
# CCTST, CCTST-N, & CCT-G835

## User Manual and Resource Guide

## Table of Contents

### Section 1: Critical Thinking
The opening theoretical section provides an overview of the assessment instrument and the core construct, “critical thinking.” Specifics about the instrument and the scores it reports are introduced. This section emphasizes the importance of critical thinking. Without the skills and the mindset to reason reflectively about their problems and decisions, individuals and communities significantly reduce their chances of survival and success.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The CCTST and “Critical Thinking”</td>
<td>8</td>
</tr>
<tr>
<td>Testing in Languages Other than English</td>
<td>9</td>
</tr>
<tr>
<td>Results Reporting and Score Array</td>
<td>11</td>
</tr>
<tr>
<td>Scores Reported</td>
<td>12</td>
</tr>
<tr>
<td>Score Descriptions</td>
<td>13</td>
</tr>
<tr>
<td>Versions that Include Numeracy</td>
<td>14</td>
</tr>
<tr>
<td>Why Measure Quantitative Reasoning (Numeracy)?</td>
<td>15</td>
</tr>
<tr>
<td>Why Measure Critical Thinking?</td>
<td>16</td>
</tr>
<tr>
<td>The APA Delphi Consensus Definition of Critical Thinking</td>
<td>18</td>
</tr>
<tr>
<td>The Importance of Being Willing and Able to Think Well</td>
<td>19</td>
</tr>
</tbody>
</table>

### Section 2: Administration Options
This practical section describes the wide selection of comprehensive and customizable options available to you for your data collection. Whether you are planning to administer the CCTST through a browser, LMS, mobile device, or in paper and pencil format, our staff will explain use of the design options to help you to tailor data collection to your project.

<table>
<thead>
<tr>
<th>Purpose/Project</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purposes and Projects</td>
<td>24</td>
</tr>
<tr>
<td>Assessing Individuals</td>
<td>24</td>
</tr>
<tr>
<td>Admissions, Advising, Proficiency Testing, Intern or Student Placement,</td>
<td></td>
</tr>
<tr>
<td>Professional Development, Hiring</td>
<td>24</td>
</tr>
<tr>
<td>Assessing Groups</td>
<td>25</td>
</tr>
<tr>
<td>Cohort Assessment, Outcomes Assessment, Program Efficacy,</td>
<td></td>
</tr>
<tr>
<td>Group Proficiency, Staff Development</td>
<td>26</td>
</tr>
<tr>
<td>Preliminary Considerations</td>
<td>26</td>
</tr>
<tr>
<td>Choose the Right Test</td>
<td>26</td>
</tr>
<tr>
<td>Collect the Most Informative Data</td>
<td>27</td>
</tr>
<tr>
<td>Examples of Sampling Design</td>
<td>27</td>
</tr>
<tr>
<td>Motivate People to Give Their Best Effort</td>
<td>28</td>
</tr>
<tr>
<td>Consider Your Test Administration Option(s)</td>
<td>29</td>
</tr>
<tr>
<td>Learning Management System (LMS) Administration</td>
<td>29</td>
</tr>
<tr>
<td>Online Administration</td>
<td>30</td>
</tr>
<tr>
<td>Getting Started</td>
<td>30</td>
</tr>
<tr>
<td>Checklist for Hands-On Online Assessment Administration</td>
<td>31</td>
</tr>
<tr>
<td>Proctor Instructions: Online Assessment Administration</td>
<td>34</td>
</tr>
<tr>
<td>Paper-and-Pencil Administration</td>
<td>35</td>
</tr>
<tr>
<td>Getting Started</td>
<td>35</td>
</tr>
</tbody>
</table>
Section 3: Results Reported
This section presents a step by step guide to the interpretation of the scores reported for this instrument. Assessment reporting formats include charts, statistical tables, spreadsheets, and individual reports.

Interpreting Score Reports 40
Interpreting Individual Test taker Reports 40
Interpreting Spreadsheet Score Reports 44
  Step 1: Interpret Each Individual’s OVERALL Score 46
  Step 2: Examine Individual Comparison Percentile Scores 46
  Step 3: Examine the Performance Assessment for OVERALL to
  Determine the Strength of the Scores 47
  Step 4: Examine the Performance Assessment of the Scale Scores 49
Interpreting Group Score Reports 52
The Table of Statistics and the Group Histogram 52
  Step 1: Interpret the Group’s Mean OVERALL Score 53
  Step 2: Examine the Mean of the Percentile Scores of the Group 54
  Step 3: Determine the Strength of the Mean OVERALL Score
  Using the Recommended Performance Assessments Table 55
  Step 4: Interpret the Scale Scores for this group of test takers 56
Important Considerations when Analyzing Score Reports 59
Difference Scores, Gains, Outliers, Discarding False Tests ... 59
Assessing the Effects of an Educational Program 61

Section 4: Validity and Reliability
This section provides important information relating to the validity and reliability of Insight Assessment’s instruments. Major topics include content, construct, criterion (predictive) validity, internal consistency, and test-retest reliability. Included are hyperlinks to published research reports about the validity and reliability of the instruments.

Content, Construct, and Criterion (Predictive) Validity 64
Internal Consistency Reliability (KR-20, Cronbach’s Alpha) 68
Test-Retest Reliability 69
Published Evidence of Validity and Reliability – Research Reports 70

Section 5: Resources
This section provides some helpful information for teachers and trainers, and also conceptual information for those involved in developing learning outcomes assessment projects. If you are not reading this as a digital file, go to www.insightassessment.com/Resources to find all of these resources posted. We invite you to incorporate these links into program posts for educational purposes to help your trainees obtain the most up to date versions of these materials.

Talking About Critical Thinking 72
Teaching and Training Tools 74
Research Findings 76
Quotes about Thinking Courageously and Well 77
Section 6: Customer Relationship
This section provides important legal messages and notifications pertaining to the use of Insight Assessment test instrument use licenses, including the fundamental agreement for the use of testing licenses, non-disclosure and non-compete agreement, buyer qualification, privacy, data security, instrument protection, disability accommodation, and copyrights.

User Licensure Agreement 78
Privacy Policy 80
Data Security 81
Instrument Protection 82
Disability Accommodation 84
Copyright Notices 85

Tables and Figures
Table 1A: Partial Spreadsheet Report of Individual Demographics (right side) 44
Table 1B: Partial Spreadsheet Report of Individual Scores (left side) 45
Table 2: Descriptions of Recommended Performance Assessments OVERALL Scores 47
Table 3: Recommended Performance Assessments for the OVERALL Score 48
Table 4: Recommended Performance Assessments: 34-Point CCTST Scale Scores 49
Table 5: Example of Scale Score Interpretation 50
Table 6: Recommended Performance Assessments: 100-Point CCTST Scale Scores 51
Table 7: Recommended Performance Assessments CCT-G835 Scale Scores 51
Table 8: Group Scores for XYZ University 52
Table 9: (Reprinted Table 8) Group Scores for XYZ University 56

Figure 1: Sample Individual Test Taker Report 42
Figure 2: OVERALL Score Distribution for XYZ University - Undergraduate Sample 53
Figure 3: Recommended Performance Assessments of the XYZ University Sample 55
Figure 4: Distribution of Numeracy Scores for ABCD University 57
Figure 5: Distributions of Scale Scores for QRST University 58
Figure 6: Pretest and Posttest OVERALL Scores Comparison 60
Figure 7: Difference Scores Comparing Pretest with Posttest Scores 63
Section 1: Critical Thinking:

This opening theoretical section provides an overview of the assessment instrument and the core construct, “critical thinking.” Specifics about the instrument and the scores it reports are introduced. This section emphasizes the importance of critical thinking. Without the skills and the mindset to reason reflectively about their problems and decisions, individuals and communities significantly reduce their chances of survival and success.

The CCTST and “Critical Thinking”

The California Critical Thinking Skills Test, CCTST, in all of its many forms and versions, has been a premier instrument for measuring critical thinking skills for more than 25 years. The CCTST measures high-stakes reasoning and decision making processes. The CCTST (and associated instruments, such as the BCTST, HSRT, TER, BRT, MDCTI, LSRP, and TRAA) are based on the APA Delphi Consensus Definition of Critical Thinking, an interdisciplinary consensus that has been embraced worldwide as characterizing what is meant by the term ‘critical thinking.’ The item pool that supports these instruments has been refined through a continuing series of instrument development projects at varying educational levels, across varying disciplines, and in various languages, resulting in an array of critical thinking assessment instruments designed to validly and reliably assess candidates, trainees, students, and working professionals. There is an additional discussion of the APA research project at the end of this section. If this definition of critical thinking describes the skills you plan to assess, the CCTST will be an effective assessment instrument for your project.

The CCTST and CCTST-N forms of this instrument are calibrated for Undergraduate and Graduate level students or comparable population groups. The CCT-G835 is calibrated to differentiate well in groups of doctoral level students and working professionals who have very strong educational preparation.

Each skills test question requires that the test taker make an accurate and complete interpretation of the question, consider the information presented, and reason to the best option from among those provided. There are varying numbers of items on different tests within the CCTST family of reasoning skills tests, but in each case the length of the instrument and the time limit for test administration purposes are set to permit maximum performance within the range of possible effort for the intended test taker group.
The validation studies of the first generic forms of the CCTST were conducted using a case control methodology in college-level institutions in California. These studies lead to the first generic version of the California Critical Thinking Skills Test (CCTST). Subsequently, the item pool has been greatly expanded and now supports the testing of critical thinking skills in persons from Grades 3 through doctoral level trainees.

Items used in versions of the CCTST are continually refined for their ability to capture the reasoning process of test takers and to expose common human reasoning errors that result from weak critical thinking. All forms of the CCTST provide both an OVERALL Score for critical thinking and a selection of scale scores to assist the trainer or instructor to focus curricula and training opportunities to address particular weaknesses in both individuals and groups. Items contained in the CCTST (all forms) are tested for their ability to differentiate well between individuals when the items are taken as a group. The items use everyday scenarios, appropriate to the intended test taker group. The response frame is in multiple choice format. Any specialized information needed to respond correctly is provided in the question itself.

The newest forms of the CCTST provide an OVERALL Score that is the best comprehensive measure of an individual’s critical thinking skills, seven specific skills scores, and when applicable, a comparison percentile to allow administrators to compare their sample’s scores with an external criterion. OVERALL Score and scale scores are qualitatively interpretable in terms of performance.

The CCTST instrument development team includes experts in critical thinking, assessment, psychometrics and measurement, statistics, and decision science. Continuing research on the CCTST focuses on the valid and reliable measurement of critical thinking skills at all levels of educational and occupational expertise. Specialized forms of the CCTST use item stems that have the context of the professional workplace targeted by the instrument. To assure that these contexts would be appropriately engaging for test takers, the development of these measures also involved consultation with working professionals in each of the professional areas.

Testing in Languages Other than English

To obtain a valid measure of reasoning skills, it is necessary that there be no language or cultural barrier to understanding assessment items. Translations of the CCTST and related instruments are conducted using a rigorous process that addresses both of these issues.¹

- We specialize in high quality culturally-appropriate translations of our copyright-protected, research-based tools. Insight Assessment researchers work with professional translators and with native speakers to develop valid and reliable translations. Translations undergo rigorous review and validation in the field. Authorized translations are currently available for global use. Additional translations can be made available by special request.

¹ If the objective is to assess how well an individual can demonstrate evidence of critical thinking skills while communicating in a second language (for instance, English) the use of an English language assessment instrument is appropriate, but the assessment score will be potentially altered in relationship to English language comprehension.
• We also provide independent language flexibility in the test taker interface (TTI). The test taker can select from a variety of languages on the interface to assure they understand navigation and test instructions. It is important to us and our customers to only assess the individual’s thinking skills and attitudes, not their ESL abilities.

• Test taker reports can be delivered in multiple languages. Contact us to discuss your specific needs.

• Our multicultural capabilities go beyond the basic language to include many country-specific variants, date formatting, number formatting, image selection, proper names, symbol and color selection. Cultural sensitivity is vital in the assessment of thinking.

Authorized translations of the CCTST are available in many languages. Each authorized translation is the product of a collaborative effort between the instrument development team and an international scholar. The development and authorization of new language forms of the CCTST requires a validation study. Translation projects are underway which will expand the list seen here. Check our website for the most complete list of authorized translations.

Visit our website for the most up-to-date list of available valid translations of the CCTST.

As with all test instruments distributed by Insight Assessment, new language forms of the CCTST are authorized only when the new items and scales achieve psychometric performance standards. Scholars with interest in a possible translation project should consult the website for additional information.
Results Reporting and Score Array

All versions of the California Critical Thinking Skills Test (e.g. the CCTST-N) provide a comprehensive array of scores that are valid and reliable indicators of strength in critical thinking skill (higher scores) and, in some cases, indicators of those at risk for poor performance in academic programs or workplace situations (scores that fail to manifest critical thinking skill). This score package includes an OVERALL Score, a corresponding percentile score that benchmarks the OVERALL Score against an external comparison group selected by the client (criterion-based score), and an array of scale scores that describe relative strengths and weaknesses in specific critical thinking skills.

The CCTST Score Package includes charts and statistical tables describing the aggregated scores for the group, as well as a spreadsheet showing every score for each individual in the group. Consult Section 3 of this document for details on how to interpret the reported scores.

Online test administration includes individual reports that can be made available to the test takers at the option of the client.

The premier tools for critical thinking assessment in higher education.
Scores Reported

**OVERALL Score** is the most informative measure of an individual’s critical thinking skills. In order to receive a Superior or Strong OVERALL Score the individual must demonstrate skills in all of the cognitive skill areas associated with critical thinking.

**CCTST Scale Scores**: Critical thinking is a holistic process, but different individuals and groups of individuals have been shown to have relative strengths and weaknesses in several easily addressed areas (described briefly below and in more detail in the Topics of Interest section of this test manual). The newest versions of the CCTST include the following scale scores identifying areas of strengths and relative weakness in cognitive skills associated with critical thinking:

- Analysis
- Interpretation
- Inference
- Evaluation
- Explanation
- Induction
- Deduction
- Numeracy (CCTST-N versions)

Earlier versions of the CCTST and current paper-and-pencil versions of the CCTST provide an OVERALL Score, a percentile ranking and an array of five skill scale scores to inform test administrators of these relative strengths and weaknesses. The older versions do not break out Interpretation, Explanation, or Numeracy as separate scores.

**Recommended Performance Assessment**: The CCTST OVERALL Score and all of the CCTST specific skill scores are qualitatively interpretable (for example they can be determined to be Superior, Strong, Moderate, Weak, or Not Manifested.) The specific modifiers used to interpret the quality of the scores are listed in the section of the manual entitled “Interpreting Score Reports.” These recommended performance assessments are based on both internal data analyses from available datasets as well as independent research reporting the relationship between scores and external performance variables (academic success, workplace transition, employer ratings).

**Comparison Percentiles**: For more than twenty five years, Insight Assessment has made it possible for clients to confidently benchmark their assessment sample against student groups from K-12 through the highest level of university graduate programs and professional program students in Business and the Health Sciences. Our expert staff will assist you to select the most appropriate comparison groups available to benchmark your assessment sample scores to an external criterion. This is a scoring package option and clients may decline this option, as preferred.
Score Descriptions

OVERALL: The reasoning skills OVERALL Score describes overall strength in using reasoning to form reflective judgments about what to believe or what to do. To score well overall, the test taker must excel in the sustained, focused and integrated application of core reasoning skills including analysis, interpretation, inference, evaluation, explanation, induction, and deduction. The OVERALL Score predicts the capacity for success in educational or workplace settings which demand reasoned decision making and thoughtful problem solving.

ANALYSIS: Analytical reasoning skills enable people to identify assumptions, reasons, and claims, and to examine how they interact in the formation of arguments. We use analysis to gather information from charts, graphs, diagrams, spoken language, and documents. People with strong analytical skills attend to patterns and to details. They identify the elements of a situation and determine how those elements interact. Strong interpretation skills can support high-quality analysis by providing insights into the significance of what a person is saying or what something means.

INTERPRETATION: Interpretative skills are used to determine the precise meaning and significance of a message or signal, whether it is a gesture, sign, set of data, written or spoken words, diagram, icon, chart, or graph. Correct interpretation depends on understanding the message in its context and in terms of who sent it, and for what purpose. Interpretation includes clarifying what something or someone means, grouping or categorizing information, and determining the significance of a message.

INFERENDE: Inference skills enable us to draw conclusions from reasons and evidence. We use inference when we offer thoughtful suggestions and hypotheses. Inference skills indicate the necessary or the very probable consequences of a given set of facts and conditions. Conclusions, hypotheses, recommendations, or decisions that are based on faulty analyses, misinformation, bad data, or biased evaluations can turn out to be mistaken, even if they have been reached using excellent inference skills.

EVALUATION: Evaluative reasoning skills enable us to assess the credibility of sources of information and the claims they make. We use these skills to determine the strength or weakness of arguments. Applying evaluation skills, we can judge the quality of analyses, interpretations, explanations, inferences, options, opinions, beliefs, ideas, proposals, and decisions. Strong explanation skills can support high-quality evaluation by providing the evidence, reasons, methods, criteria, or assumptions behind the claims made and the conclusions reached.

EXPLANATION: Explanatory reasoning skills, when exercised prior to making a final decision about what to believe or what to do, enable us to describe the evidence, reasons, methods, assumptions, standards, or rationale for those decisions, opinions, beliefs, and conclusions. Strong explanatory skills enable people to discover, to test, and to articulate the reasons for beliefs, events, actions, and decisions.

INDUCTION: Decision making in contexts of uncertainty relies on inductive reasoning. We use inductive reasoning skills when we draw inferences about what we think is probably true based on analogies, case studies, prior experience, statistical analyses, simulations, hypotheticals, and patterns recognized in familiar objects, events, experiences, and behaviors. As long as there is the possibility, however remote, that a highly probable conclusion
might be mistaken even though the evidence at hand is unchanged, the reasoning is inductive. Although it does not yield certainty, inductive reasoning can provide a confident basis for solid belief in our conclusions and a reasonable basis for action.

**DEDUCTION:** Decision making in precisely defined contexts where rules, operating conditions, core beliefs, values, policies, principles, procedures, and terminology completely determine the outcome depends on strong deductive reasoning skills. Deductive reasoning moves with exacting precision from the assumed truth of a set of beliefs to a conclusion that cannot be false if those beliefs are true. Deductive validity is rigorously logical and clear-cut. Deductive validity leaves no room for uncertainty, unless one alters the meanings of words or the grammar of the language.

**Versions that Include Numeracy**

Reasoning in mathematical contexts (Numeracy) is an important component of Twenty First Century education and a key skill for the STEM, health care, and business related programs and professional practice. The ability to interpret graphs and charts that express information numerically, to frame problems with attention to quantitative data, and to make judgments based on the analysis and evaluation of mathematical information are only a few examples of why it is valuable to assess critical thinking skills in the context of numeracy.

**The CCTST-N** measures critical thinking skills and provides a separate measure of Numeracy. Numeracy is vital for success in today’s heavily quantitative academic and professional learning and decision making environments. The measure of numeracy included with adoption of the CCTST-N defines Numeracy as follows:

**NUMERACY:** Numeracy skills are used when applying knowledge of numbers, arithmetic, measures, and mathematical techniques to situations that require the interpretation or evaluation of information. Numeracy refers to the ability to solve quantitative reasoning problems, or to make judgments derived from quantitative reasoning in a variety of contexts. More than being able to compute a solution to a mathematical equation, numeracy includes the understanding of how quantitative information is gathered, manipulated, and represented visually, such as in graphs, charts, tables, and diagrams.

If you are currently using the CCTST and would like to move to a version of the instrument that includes a reported score for Numeracy, contact your Insight Assessment representative or send us a note at “Contact Us” [www.Insightassessment.com](http://www.Insightassessment.com).
Why Measure Quantitative Reasoning (Numeracy)?

Numeracy is the ability to solve quantitative reasoning problems and to make well-reasoned judgments derived from quantitative information in a variety of contexts. More than being able to compute or calculate a solution to a mathematical equation, numeracy includes understanding how quantitative information is gathered, represented, and correctly interpreted using graphs, charts, tables, and diagrams. A person with strong numeracy skills can apply his or her knowledge of numbers, arithmetic, algebraic relationships, geometric relationships, and mathematical techniques to situations that require the interpretation or evaluation of quantitative information. The person with strong numeracy skills is able to recognize and use quantitative information, patterns, ratios, percentages, spatial relationships, and statistical information intelligently and correctly when drawing conclusions, making estimates, and explaining or predicting events or behavior.2

Strong numeracy skills distinguish successful business executives, managers, health care professionals, engineers, architects, scientists, real estate agents, sales professionals, financial analysts, and policy makers. Spreadsheets are the order of the day. Professionals in every field know that key decisions often depend on a thorough weighing of costs and benefits, accurate projections of likely outcomes, and the ability to interpret correctly the complex numerical relationships represented in tables, charts, graphs, blueprints, or diagrams.

Numeracy is for everyone. From political polling data to the stats on the sports pages, from the economic news about stocks and interest rates, to the impact on our lives of the price of gas and food, our lives are awash in numerical data. What does an increase in the cost of living index or a decrease in the unemployment rate mean for me and my family? How important to my health is achieving a 5% decrease in my risk of heart attack, my blood pressure, or my BMI? How much will it cost to earn a college degree and what impact would that degree have on my earning potential? If I put this purchase on my credit card, what will it actually cost me? How does a change in the tax code impact my take-home pay?3

The development of numeracy skills, like critical thinking skills, begins in childhood. Australia has identified numeracy as a national educational goal. That nation operationalizes numeracy for curricular purposes as “calculating and estimating, recognizing and using patterns, using fractions, decimals, ratios, rates and percentages, ...


using spatial reasoning, interpreting and drawing conclusions from statistical information, and using measurement.”

In the United States the Common Core State Standards Initiative, 2011 reform effort locates critical thinking about math as a central learning outcome at all grade levels. Critical thinking applied to math focuses on mathematical problem solving, quantitative reasoning, argument construction, argument evaluation, structural analysis, and strategic application of tools to solve math problems, and modeling with mathematics. Numeracy skills can be thought of as the application of analysis, inference, interpretation, explanation, evaluation, as well as reflection on one’s own reasoning process (metacognition) to numerical and spatial information and relationships.

Children, adolescents, and adults alike need to be able to think critically about the mathematical and numerical information that surrounds them in the media, on the Internet, in schools and workplaces, and in society at large. Dr. Carol Gittens points out “leading scholars and educators have consistently argued that numeracy rivals reading literacy and language fluency in its importance for learning and for life.” Dr. Gittens notes that “numerically literate individuals understand the social and pragmatic function of mathematics and have the ability to reason about mathematical information.” Numeracy is essential in our data-driven world, if one hopes to be successful in the workplace, to achieve academically, to be engaged citizens, and to make thoughtful and well supported decisions in any domain of life that admits of the relevance of quantitative information.

Why Measure Critical Thinking?

Many believe it is obvious who the best thinkers are in a given agency or institution. But these impressions are often based on fortunate happenstance, expressions of self-confidence, and hierarchical position in the group, and hindsight. We can no longer afford to be mistaken about best thinking, when error rates are already in question, when difficult problems and decisions must be addressed, and where poor judgments can lead to irreparable damage and even cost lives.

At all ages of life, wherever purposeful and reflective judgment is needed, critical thinking skills and mindset (habits of mind) are essential. Each of us makes judgments that affect ourselves, our families, our country, and our world. In all of these cases, when the stakes are high, critical thinking is vital. Learning demands strength in critical thinking because learning requires the interpretation and integration of new knowledge and its practical and appropriate application when encountering novel situations, problem conditions and innovative opportunities.

---


Critical thinking is one of the key skills valued by employers, according to recent research. In 2013, for example, Hart Research Associates surveyed CEO’s and other C-suite executives at more than 300 private sector for-profit and non-profit organizations. 93% agreed that, “a candidate’s demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major.” In Robert Wood Johnson Foundation’s July 2009 Jobs to Careers, Randall Wilson wrote: “Early assessment of critical thinking maximizes workforce efficiency and increases the potential for learning and educational effectiveness at all levels.” The truth of this claim is even more apparent today. World culture and an information-intensive everyday life invite us to apply critical thinking to interpret, analyze, evaluate, explain, and draw warranted inferences about what to believe and what to do in a stream of novel and too often time-limited or high-stakes, uncertain situations. For the thinking process to be successful, it must be done with the habits of mind that have been identified as supporting strength in critical thinking. Studies, some of which are listed in the research section of the Insight Assessment website, have consistently shown that strength in critical thinking correlates with workplace and academic success, certification and licensure in the most valued professions, and survival of some of life’s most difficult challenges.

We are learning more about how humans actually engage and try to understand problems and how people make judgments. Perhaps more importantly, we are learning more about how they make bad judgments, often without realizing it. When objective measures reveal weaknesses in reasoning skills and habits of mind, there are effective training and teaching techniques that can be used to strengthen those skills and to foster a more positive disposition toward thinking and reasoning. An honest and concerned appraisal of critical thinking skills and habits of mind manifested by working adults and students in all programs of study, together with a focused response to any demonstrated deficiencies, is the path to growth and achievement for individuals and for society as a whole.

<table>
<thead>
<tr>
<th>Weakness in critical thinking leads to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>* failure to learn * confused and confounded communication *</td>
</tr>
<tr>
<td>job loss * lost revenue * patient deaths * ineffective law enforcement * gullible voters * imprisonment * prejudice *</td>
</tr>
<tr>
<td>higher combat casualties * upside down mortgages *</td>
</tr>
<tr>
<td>thoughtless criticism * vehicular homicide * heart disease *</td>
</tr>
<tr>
<td>unplanned pregnancies * financial mismanagement * family violence * repeated suicide attempts * drug addiction *</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>But training and assessing critical thinking to be sure of successful gains will lead to better outcomes...</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I’m glad I thought that through!” vs. “What was I thinking?”</td>
</tr>
<tr>
<td>“That was a really good decision!” vs. “That was a terrible decision!”</td>
</tr>
<tr>
<td>“We fixed that problem, maybe just in time.” vs. “Why didn’t we address that when we had the chance?”</td>
</tr>
</tbody>
</table>

---

8 IT TAKES MORE THAN A MAJOR: Employer Priorities for College Learning and Student Success,” Hart Research Notes, Hart Research Associates, 1724 Connecticut Avenue, NW, Washington, DC 20009. 318 employers were surveyed online. Each had 25 or more employees and indicated that more than 25% of their new hires held an academic degree, associates or baccalaureate.
Students and workers with weak critical thinking skills and mindset are not prepared to benefit from the educational training program that will be offered to them. Their presence in the classroom or laboratory causes instructors to slow or alter the training of other students and trainees. Their presence in clinics, internships, or field exercises risk an increase of injuries and liabilities related to likely errors of both inaction and wrong action. Unaddressed weakness in critical thinking skill results in loss of opportunities, of financial resources, of relationships, and even loss of life. There is probably no other attribute more worthy of measure than critical thinking.

Human reasoning and problem solving are highly complex processes. Advances in the science of human cognition enable us to analyze, measure, and improve our human problem solving and decision making. A measure of critical thinking that describes an individual's comparative strength is a valuable aid in determining a person's capacity to benefit from training or to succeed in their job and in identifying which skills or habits of mind need attention.

Today, educational programs and workplace training programs are being required to demonstrate that they are effectively improving critical thinking skills and mindset. Individual measures of core reasoning skills (i.e. analysis, interpretation, inference, evaluation, explanation, numeracy, inductive reasoning, and deductive reasoning) and mindset (Truth-seeking, open-mindedness, Analyticity, Systematicity, Confidence in Reasoning, Inquisitiveness, and Maturity of Judgment) provide valuable information about potential hires and guidance as to where to dedicate programs of improvement in workers and students.

**The APA Delphi Consensus Definition of Critical Thinking**

*Critical thinking is the process of purposeful, reflective judgment focused on deciding what to believe or what to do.* Critical thinking is a pervasive human phenomenon. Many times each day we analyze information, interpret events and situations, evaluate claims, and evaluate the reasons offered in their support. Based on these analyses, interpretations, and evaluations we draw inferences and make reflective judgments about what to believe and what to do. These reflective judgments are the focus of critical thinking.9

Down through the millennia the great philosophers of cultural traditions throughout the world described that constellation of attitudes and attributes most closely associated with the eager desire to engage problems using thinking skills. More than 80 years ago, in *How We Think*, John Dewey expressed the significance of these habits of mind.10 The practiced use of critical thinking as an approach to the important problems faced in one’s life and work situations requires the development of habits of mind that demand excellence in reflective judgment.

In the late 1980’s a foundational concept analysis to study was conducted to develop a consensus definition of critical thinking. This study is now referred to as

---

9 Facione, PA., “Critical Thinking: What it is and Why it Counts,” [Go here for the latest update, or for Spanish or Chinese.](#)

10 Dewey, J. (1933). "If we were compelled to make a choice between these personal attributes and knowledge about the principles of logical reasoning together with some degree of technical skill in manipulating special logical processes, we should decide for the former." (p.34) *How We Think: A Restatement of the Relation of Reflective Thinking to the Educational Process.* Lexington, MA: D.C. Heath.
the APA Delphi Study of critical thinking. The strength of the study was the use of the Delphi research method which allows the investigator to compile a consensus position without the undue influence of any one participant scholar or expert. The blinded, iterative conceptual clarification process that occurs with the Delphi approach permits the discussion of key questions and concepts, and the development of consensus, without introducing bias related to the prestige of the experts involved. The resulting consensus definition of critical thinking, now world famous, can be found in a variety of sources, and is also excerpted later in this section.

An important component of the APA Delphi Study was the discussion of the dispositional side of the critical thinker. One must be disposed to think critically as well as have the skills to do so. The Delphi participants were a mixed disciplinary group, and among the participants were a cadre of philosophers who were well versed in the writings of the Greeks. Unlike those who took a cognitive science approach to the project, these philosophers contributed a definition of critical thinking that centered largely on the attributes of the person who demonstrated critical thinking. The emergence of the description of the ideal critical thinker and all of the submitted subtext led to the insight that it would perhaps be incomplete to measure thinking skills while leaving out the personality component.

More than two decades of international research across disciplines affirms the importance of developing a strong critical thinking disposition. The CCTDI measures these attitudes and attributes, assessing the “willing” side of “willing and able to think well.” Its companion instruments, like the CCTST, measure the skills.

Notice the clear attitudinal expectations captured in the quote in the text by Peter Facione and Carol Gittens when they speak about the value of strong critical thinking. Of course the strong critical thinker needs to be able to analyze, infer, and explain with confidence what to believe and what to do in key judgment situations, but without the fair-minded approach to inquiry that is the heart of critical thinking disposition, the exercise is too likely to fall short of the expected quality of judgment. In fact, the use of critical thinking may not even occur.

No longer taken for granted as a byproduct of all educational processes, the training of critical thinking skills is becoming an increasing focus of professional preparation programs. The assurance of excellence in professional judgment is the result of the sound use of critical thinking skills and the reliable and strong disposition to use those critical thinking skills. The alternative (acting without adequate analysis of the problem, repeating a previous decision behavior unreflectively, or continuing to carry out a protocol or process without evaluating its effect) is not an acceptable quality standard in and professional workplace, nor does it bode well for life decisions in general.

Equally necessary, is the training of habits of mind consistent with the dispositional side of strength in thinking. The CCTDI offers a way to assess the success of these training efforts.

The Importance of Being Willing and Able to Think Well

Critical thinkers must be both willing and able to think critically in the course of making decisions. It is possible to have strong critical thinking skills that are not being applied to decisions and problem solving. Possessing the requisite cognitive skills is necessary to being a good critical thinker, but so is being disposed to value and use those skills. The CCTST (California Critical Thinking Skills Test) is often administered in combination with the California Critical Thinking Disposition Inventory (CCTDI) to assess both the critical thinking skills and the habits of mind in

---


students and practicing professionals. The MDCTI, LSRP, TRAA, and the INSIGHT Series of instruments all include a mindset part as well as a skills part.

Before the CCTDI was available to measure thinking habits of mind, many assumed that strength in the disposition toward critical thinking would be strongly correlated with strength in critical thinking skills. Not true. Certainly many individuals are both disposed (willing) to address problems using critical thinking and skilled (able) to do so. Some individuals demonstrate skills, and yet are unwilling to use those skills to engage problems unless heavily prompted to do so. Others may be eager to address problems using thinking, but yet not possess the critical thinking skills to do so. And, of course, there are those who are neither willing nor able to think critically.

The California Critical Thinking Disposition Inventory (CCTDI) is the premier critical thinking disposition instrument in the world today. Based on the Delphi Expert Consensus Definition of Critical Thinking\(^\text{13,14}\) description of the ideal critical thinker, this instrument has been used in decades of empirical and conceptual studies of human reasoning behavior.\(^\text{15}\) The importance of the dispositional side of critical thinking was described by the Delphi experts in these terms:

Cognitive skills are like physical skills -- through education, training, and exercise an individual can gain ever greater proficiency in their use. But the opportunities individuals have had during their lives to train, apply, and refine those skills may differ vastly. Opportunities to learn often go unused in those who do not have the habits of mind associated with self-motivated learning. Many people learn only what they think they need to learn to achieve their goals. Their judgment may be wrong about what is needed.

Engaging problems and making decisions using critical thinking involves both skills and habits of mind. A strong critical thinker is one who is both disposed to think critically and has the skills to do so.

\(^{13}\) The American Philosophical Association. (1990) Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction, (“The Delphi Report”), ERIC Doc. No. ED 315-423, pp. 80. [Executive summary, including tables and recommendations (pp. 22) also available through Insight Assessment]

\(^{14}\) Appendices 1 and 2 include a full discussion of the research to define the construct of critical thinking skills and disposition measured by the CCTST family of test Instruments.

\(^{15}\) Scholars: Consult Section 5 of this document for a subset of these independent research studies. Also consult dissertation abstracts for completed dissertation studies.
Just as skills assessments measure core cognitive skills (abilities), disposition instruments measure attributes. These could also be called traits or mindset, and they can be used to describe a person in terms of their inclination to use critical thinking, in contrast to other strategies, when faced with problems to solve, ideas to evaluate, or decisions to make. Research indicates that the disposition toward critical thinking can be understood in terms of positive habits of mind. A person or group strongly disposed toward critical thinking is habitually truth-seeking, open-minded, analytical, systematic, inquisitive, confident in reasoning, and judicious.

**Characteristics of Strong Critical Thinkers**

- inquisitive with regard to a wide range of issues
- concerned to become and remain well-informed
- alert to opportunities to use critical thinking
- trusting in the processes of reasoned inquiry
- self-confident in their reasoning skills
- open-minded regarding divergent world views
- flexible when considering alternatives and opinions
- understanding of the opinions of other people
- fair-minded when appraising reasoning
- honest in facing biases, prejudices, stereotypes, or egocentric tendencies
- prudent in suspending, making, or altering judgments
- willing to reconsider and to revise views where honest reflection suggests that change is warranted

As indicated above, the APA Delphi panel of international experts defined “critical thinking” for purposes of training and measurement by emphasizing the reflective thinking process: “**Critical thinking is the process of purposeful, self-regulatory judgment. This process gives reasoned consideration to evidence, context, conceptualizations, methods, and criteria.**” This powerful two-sentence definition is the heart of the American Philosophical Association Delphi Consensus. A very detailed and comprehensive definition of the skills and habits of mind associated with strength in critical thinking emerged from this multiyear study and was published in 1990 (ERIC Doc No ED 315 423 1990).

To this we would add, “**Critical thinking is using this process of purposeful, reflective judgment to decide in a thoughtful, truth-seeking, and fair-minded way what to believe or what to do.**” In the absence of critical thinking, one might simply follow the demands of authority, act without a full awareness of the situation, thoughtlessly do what has been done before, or do nothing when action is needed.

The impetus for the Delphi study was an increasing tendency to use the term *critical thinking* to refer to any type of thinking associated with a positive outcome. Experts in the field were aware that building strength in critical thinking was not an automatic result of every educational offering. The APA Delphi study facilitated the discussion of experts from across the disciplines regarding the meaning of the term critical thinking and the thinking skills associated with this term. The study’s lead researcher (P. Facione), using the Delphi method developed by the Rand Corporation, obtained objective input regarding the definition of critical thinking from scholars across the disciplines who were blinded to the source of the input. Unexpectedly, the resulting consensus included both a description of the relevant thinking skills and a description of the mental disposition of someone regarded as having strength in critical thinking.
This work subsequently provided a framework for a national discussion of the meaning and importance of critical thinking among employers, educators and policymakers. In this second, federally funded study spearheaded by Penn State University, the national sample of employers, educators, and policymakers endorsed both the description of critical thinking skills and the description of the ideal critical thinker (disposition) as what was needed in US workers, students, and leaders. Often referred to as the APA Delphi Consensus Definition of critical thinking, this consensus definition document has proven to be meaningful in educational institutions, government agencies, and business organizations around the world.

Today, for some, the term is very closely associated with informal logic, for others an alternative way to describe scientific reasoning or rhetorical analysis, and for yet others it is a synonym for clinical reasoning or professional judgment. In all of these varying cases and differing disciplines, critical thinking is the major component of problem definition and reflective judgment processes across all contexts.16

Many times each day, we analyze information, interpret events and situations, and evaluate claims and the reasons offered in their support. Based on those analyses, interpretations, and evaluations, we draw inferences and make reflective judgments about what to believe and what to do. These reflective judgments are the focus of critical thinking. The *California Critical Thinking Skills Test* measures these critical thinking skills, assessing the test taker’s strength in making reflective, reasoned judgments.

The empirical analyses involved in the development of the companion measure of the critical thinking mindset, the *California Critical Thinking Disposition Inventory (CCTDI)*, effectively reduced the APA Delphi Study discursive description of the ideal critical thinker from nineteen independent, descriptive phrases endorsed by consensus to seven dispositional constructs measurable by scales. In an important respect, the CCTDI refines and extends the conceptualization of critical thinking expressed in The Delphi Report. These constructs have since been endorsed as description of the attributes of someone who is a critical thinker by educators and a wide range of working professionals in the United States and in more than 40 countries around the world.

---

16 This section is a relatively short answer to the question: “What is meant by the term critical thinking?” If a more complete discussion is desired, refer to the Resources Section of this user manual.
“Critical Thinking: What It Is and Why It Counts,” Peter Facione, is an essay written for students, trainees, teachers, staff development educators, and the general public. This easy to read essay communicates the importance of critical thinking in all aspects of life. This essay has been translated into Chinese and Spanish. It is updated periodically to include new research on human reasoning. Many publications have included this essay and it is a link on many websites. A free download of the most recent version or for Spanish or Chinese translation, for purposes of education and educator training, can be found on our website.

The APA Delphi Description of the Ideal Critical Thinker

“The ideal critical thinker is habitually inquisitive, well-informed, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit.”
Section 2: Administration Options

This section describes the wide selection of comprehensive and customizable options available to you for your data collection. Whether you are planning to administer one or more IA assessment instruments through a browser, LMS, mobile device, or in paper and pencil format, our staff will explain use of the design options to help you to tailor data collection to your project.

Purposes and Projects

Assessing Individuals

Individual test taker scores provide key information for advising and mentoring. Whether you are hiring a new employee or admitting a new student, an assessment of the personal strengths of the candidate helps to direct training resources and improves the likely success of the training program.

- **Admissions** – Example: When programs are in high demand and student retention is a factor in assuring that institutional goals are met, adding a measure of critical thinking to the admissions profile assists with identifying candidates who have the skills and the mindset to learn, to persist, and to succeed.

- **Advising** – Example: Many colleges dedicate resources to create and maintain teaching and learning centers to help all admitted students to succeed. Along with writing skills, reading skills and language comprehension, critical thinking is one of the central competencies that must be assessed to help advisors direct students in program and course selection.

- **Competency or Individual Proficiency Testing** – Example: Training resources are scarce and often must be effectively directed only to those who require additional support. A threshold can be set to
highlight acceptable strength in critical thinking for your program or industry. Individuals who fail to achieve that threshold will best benefit from attending training programs aimed at growing critical thinking skills.

- **Intern and Student Placement** – **Example:** Are your trainees ready for their educational experience? Research on effective teaching and learning and studies of successful transition or reentry to the workplace have demonstrated that learning experiences must be designed to challenge but not discourage the learner. If the training is too challenging, some candidates will hide their failures until errors become apparent. Scaffolding of new knowledge delivery and well-designed practice internships are proven methods for a successful professional transition if the candidate has the requisite critical thinking skills to perform in the work environment. A standard can be set as a criterion for the demonstration of readiness to enter internship or workplace environments.

- **Professional Development** – **Example:** every student, trainee or working professional can improve their critical thinking skills and must work on this goal. A measure of overall critical thinking skills, benchmarked against a national comparison group, helps the individual to make a realistic assessment of their strengths and weaknesses in critical thinking. Individual skills assessment informs them about what types of thinking exercises will be most beneficial to them in particular.

- **Hiring** – **Example:** Orienting new employees to work responsibilities is a necessity, but doing so for an employee who proves unable to perform the work in the long run is costly when resources are limited. Employees who have weak critical thinking skills are often the source of serious liability costs as well. Adding a measure of critical thinking skills to employee hiring procedures can provide the assurance that the new member of your working team will have the ability to interpret current practices and policies, accurately apply protocols and evaluate their effectiveness within their scope of work, draw warranted inferences about potential problem situations, and provide input toward quality improvements.

### Assessing Groups

Training critical thinking skills begins with an accurate baseline assessment of group strengths and weaknesses and continues with an assessment demonstrating the outcomes and accomplishments resulting from the current training program, and perhaps a reassessment after a refinement of the training program curriculum or emphasis. Early assessments of groups provide collective diagnostics of their overall strengths and weaknesses and assist an educator or trainer to focus training efforts toward addressing gaps in the group overall.

- **New Cohort Assessment** – **Example:** Test incoming cohorts to learn about overall strength in critical thinking. Compare the group to national comparison percentiles for students and trainees in similar educational institutions or training programs. Examine average skills for individual critical thinking skill areas (analysis, inference, evaluation, inductive and deductive reasoning) to better understand the strengths of the group as a whole and to determine where to place emphasis in program objectives aimed at improving critical thinking skills.

- **Outcomes Assessment** – **Example:** Track groups over time in relationship to a focused effort to improve an educational program. Compare entry scores, perhaps gathered as a new cohort assessment, with exit scores to determine how well students have improved overall. Compare the national norm percentile of students and trainees entering your programs with those exiting the programs. Follow the
growth in overall mean scores and the proportion of test takers in each recommended performance assessment level (critical thinking skills are strong, moderate or weak/not manifested) at the completion of the training program.

- **Demonstrating the Quality of an Educational or Training Program** – **Example:** Use a new cohort assessment in conjunction with an outcomes assessment measure to determine the magnitude of the training program’s effect on building critical thinking skills. This type of assessment is needed when agencies depend on the demonstration of quality to maintain funding or support for their programs. Other agencies seek to demonstrate quality in the training of critical thinking as a measure of their value to the community and to society at large.

- **Demonstrating Group Proficiency** – **Example:** Responding to accreditation guidelines, an educational institution compares the mean score for a representative group of graduating students against the national percentiles having determined that proficiency for its students will be demonstrated if their mean score is at or above the 50th percentile.

- **Staff Development** – **Example:** Measure the relative strength of various employee groups to determine their relative skill in problem identification and problem solving. Determine the overall critical thinking strength of workplace teams and assess whether this demonstrated strength in critical thinking is adequate to workplace demands.

## Preliminary Considerations

### Choose the Right Test

**Versions of the CCTST family of instruments:** When thinking about measuring critical thinking, the first decision is whether you want to test for strength in thinking skills or measure the mindset (dispositions) that motivates a person to apply his or her skills. This is the test manual for the CCTST, a test of critical thinking skills. The next decision is which form of the test fits your test taker: This choice depends on the age and educational level of the test taker. This test manual accompanies your purchase of the CCTST designed for adult test takers of all ages. If you are testing children or using one of the specialized forms of the CCTST that is designed for Business, Health Sciences, Law, Community and Technical Colleges, Secondary Schools, Military Studies, or other specialty forms of the CCTST, contact Insight Assessment regarding a replacement test manual designed to accompany those forms of the test. Employers seeking to evaluate the core reasoning skills and related attributes of job applicants and current employees from the support staff to the executive levels are advised to consider the INSIGHT series.

Accurate measurement of critical thinking skills requires that the test be calibrated to fit the likely skill range of the planned test taker group. This version of the CCTST is designed to measure critical thinking skills in adults who are attending colleges and universities for either undergraduate or Masters level educational programs. Other forms of the CCTST are designed and recommended for individuals who are in elementary through secondary (in the USA
these are referred to as K-12 programs), or for those enrolled in doctoral level programs. There is also a recommended form of the CCTST designed for community and technical colleges.

**Reading Level Considerations:** To perform well on a critical thinking test, the test taker must be able to read the question scenario and answer choices and understand the question being asked. Some aspects of this process involve critical thinking skills of interpretation and analysis to a great extent. However, it is important that reading and language issues are not significant barriers for the test taker. With the exception of the CCT-G835, all California adult level critical thinking skills tests are set at a Flesch-Kincaid reading grade level of 8.6 or lower. K-12 versions of the tests have Flesch-Kincaid reading levels well below the grade level of the intended test taker.

**Language Comprehension:** Language is also a consideration when assigning a critical thinking test. Students or workers who are using other than their native language may have difficulty demonstrating their true critical thinking skill on the CCTST if their language comprehension is inadequate to interpret the question scenario and answer choices and understand the question being asked. There are many authorized translations of the CCTST available. Visit the “Translations” tab for a specific testing instrument to see its current list of authorized translations.

### Collect the Most Informative Data

**Sampling Decisions:** Perhaps you are interested in testing everyone in your program or organization. In that case, discussions about who to test first may not be highly relevant. In most situations, however, there is some benefit to deciding where to begin with an assessment of critical thinking skills. Here are a variety of considerations about how to identify a first group of test takers for your assessment program.

#### Examples of Sampling Design

- **Admissions:** Adding a measure of critical thinking to the information being gathered and considered for program admission is much like the design for hiring. Each program has a particular selectivity. Programs that have limited capacity tend to have a higher selectivity and would likely set the threshold for scores at a higher level than those that serve greater numbers of persons and are more interested in minimal thresholds of readiness for program participation. The recommended performance assessments for the **OVERALL Scores** are helpful to consider in determining a threshold score for your program admission purposes.

- **Program Evaluation:** The effectiveness of a training program is usually assessed by comparing scores of those entering the program with scores of the same students or employees when they exit the program. If entering cohorts are similar in most or all cases, it may be adequate to collect entry data only once or twice to establish that this is the case, and then to move to an exit only testing design.

- **Demonstrating Outcomes that Meet an External Criterion:** If the requirement of the program is that everyone or a specified proportion enrollees should achieve at least a particular level of critical thinking proficiency, and there is no concern to provide individual feedback or training to any given individual, testing at the end of the program is an appropriate design.

- **Hiring:** Two groups of test takers are often relevant: the applicant pool you are considering for an interview and strong employees who hold similar jobs in your organization. The range and average of the test scores of your current employees will help you set a threshold for scores you would prefer to have in applicants coming for interview.
Selecting an Administration Method: Instruments offered by Insight Assessment are offered digitally online and in paper-and-pencil format. Insight Assessment staff is available to consult with you regarding which of these administration methods is most appropriate or whether both may be needed in your setting.

Proctoring Testing: Insight Assessment’s online testing is protected by high-level security access and data encryption. The testing system permits maximum flexibility for scheduling test assignments, allowing them to be scheduled at whatever time is optimal. Proctored testing is the standard for assuring that tests are taken in an appropriate testing environment by the individual who is assigned to take the test. Whenever test results will be used to inform decision-making about the candidate / test taker, the testing session should be done in monitored testing centers.

Motivate People to Give Their Best Effort

Conditions of testing can have a potential effect on the testing experience, on test taker effort, and on the quality of the assessment results. Informing test takers of why they have been assigned a testing session and of the importance of providing their best effort on the assessment is often an important consideration.

Many people sustain a stronger effort on the assessment when the result is of interest to them or carries some significance to them. Informing test takers of the possibility of obtaining their assessment result may be an important consideration for your testing plan. Job applicants are rarely informed of their assessment performance. Depending on the reason for testing and the details of the educational program, employees and students are typically informed of their results at appropriate times in their educational programs (during staff development or advising sessions when testing is done as a diagnostic, or at the completion of the programs when testing is a component of program evaluation or educational outcomes assessment). Even when individual results are not offered, it is often useful to communicate the value of the testing by providing the test taker group with information about the group as a whole and how the testing scores will be used.

Most educators believe that learning about personal performance is a motivating factor for future effort at self-improvement. Scores on the Insight Assessment instruments are proven indicators of success in workplace transition and professional certification and licensure. [Sections 4 and 5 of this manual discuss predictive validity and reliability and provide hyperlinks to relevant publications and research reports.]

Depending on the design and the objectives of your testing program, it may be useful to provide people with reports of their personal performance. Individual score reports can be easily provided to each test taker when clients use electronic testing.

The decision of whether to provide assessment results to the test taker is made by the test administrator. This decision may affect the selection of test administration options. Electronic testing options enable the client to select whether or not to provide each test taker with his or her test results for viewing, printing, or emailing. In the case of paper-and-pencil testing, providing results to individual test takers must be managed by the test administrator, once CapScore™ assessment results have been returned to the test administrator by Insight Assessment.
Consider Your Test Administration Option(s)

Insight Assessment instruments are administered in a variety of ways: through the institution’s learning management system (LMS), online through an Internet browser, or paper-and-pencil. (Check our website or contact us about the availability of our tablet / mobile device app option.)

Insight Assessment instruments are timed. The time allowed is more than sufficient for a valid test administration in the absence of specified disability and when the selected test is appropriately matched to the test takers’ age and educational level. All of the Insight Assessment electronic test administration options include timers on screen to aid the test taker. An electronic testing session automatically submits a test for scoring at the end of the prescribed testing period, if the test has not already been submitted for scoring. Paper-and-pencil administration requires a proctor to monitor the timing of the testing session.

Proctored environments are optimal in educational settings for high stakes testing whether the client has selected to test electronically or using paper-and-pencil. See Section 6 of this manual for details about the client’s responsibilities with regard to instrument protection and security.

Contact us by phone (650-697-5628) or through our website to talk with one of our experienced assessment specialists about your particular test administration needs.

Learning Management System (LMS) Administration

Many Insight Assessment customers benefit from Learning Management Systems (LMS) that integrate into their business or institutional processes. These can provide tight security and control over hiring, training, and development processes. In addition to our standard testing services, Insight Assessment products are now capable of working seamlessly within your LMS and security systems. Our high-quality secure, encrypted solutions make critical thinking and disposition testing easily integrated into all key quality improvement processes of your company or institution.

Insight Assessment testing products can be delivered through Blackboard, Moodle or many other learning management systems in use at your company or educational institution. Because these LMS products vary, and your company installation will differ, we work directly with your in-house technology representative during set-up to ensure a smooth solution.
Online Administration

Getting Started

In a hurry? Your online account can often be established within one business day. Our customer support and technology staff will work with you to meet your needs.

Previewing the Online System: If you are not familiar with the assessment instrument or the use of our online system, obtaining a preview pack will help you see how our assessment instruments can best be used at your organization or institution. This user guide and technical manual accompanies a preview of the online system to provide in-depth information as needed. The preview is designed to help you to receive optimal value from your assessment adoption and to view the assessment and the assessment experience from the perspective of the individual being assessed. Each preview includes one or more opportunities to see the personal profile page, view an example of the assessment or assessments relevant to your planned project, and see how the individual being assessed will respond to and then upload their responses, and then (at the client’s option) immediately view a printable report of their scores.

Full Service Online Assessment: Businesses and personal advising and counseling customers often require continuous assessment capability with real-time results delivery. Fitting the assessment to the individual test taker provides the best measure of critical thinking ability. For some, this means having a variety of instrument versions available to fit educational level, spoken language, or specialty practice. When it makes sense to have these conditions handled as a part of the purchase agreement, Insight Assessment staff can provide you with customized support service to fit your assessment plan.

Hands-On Online Administration: Some customers prefer to schedule their own assessments and download group data themselves. Once you have become a client and have had an orientation to the online system, you will be able to log into the system as a test administrator to assign and schedule the assessments available to you through Insight Assessment, and to manage and download your assessment data. Each individual you assess is assigned a unique ID within the Insight Assessment testing system. This permits you to track their scores over time in the case of multiple test administrations. An array of assessment instruments can be added to a client’s online account as described below. You or a designated person at your institution or business can be provided with an online account that allows you to control all needed aspects of your online testing. The hands-on option is designed for customers who enjoy the ability to control the timing of assessment assignments and select varying options for each individual or group each time they begin a new assessment session.

Personalized Telephone Orientation*: To get started with hands-on administration, adoption of online testing includes a telephone orientation to your online test administrator account. During that telephone orientation, our online technology support professionals will assist you to create your Test Administrator account. This account, secured with your unique Login and Password entry to the testing system, will provide you with continuous access
to the online system capabilities. *The discussion below is a brief summary of some of the information provided in this telephone orientation session.*

**Login as a Test Administrator:** Clients access their personal Test Administrator interface using the client login button located on the Insight Assessment home page.  
www.insightassessment.com

During your orientation, you will be guided through your selection of the available online system options and making your first assessment assignment. You'll find that the system is easy to manage and offers you the opportunity to set the options in your account to match the situation at your institution or business.

As a Test Administrator you will be able to login to the Insight Assessment online system anytime, anywhere, via the Internet using your secure Login and Password.

The process is quick and easy. You will learn how to:

- set up assessments to be taken online during the time windows you specify
- choose assessments in the language of the individuals you plan to assess
- check in to see whether assessments have been completed
- set options to provide (or hide) assessment results from the individuals being assessed
- add (or remove, with staff support) demographic questions
- create a report of the scores for a group of individuals who have completed an assessment
- sort data by demographic variable, assignment or group
- download an individual assessment report
- download a spreadsheet of your group’s assessment scores
- and more, as best fits your project

* If you prefer to have an account with no need for you to personally make assessment assignments or request data downloads, talk to our technical staff about customized service.

**Checklist for Hands-On Online Assessment Administration**

**Step 1)** Assign the Login(s) and Password(s) for the individuals you plan to assess. There are two main options to consider in this process. **Option One:** If you are assessing a small number of individuals (e.g. hiring candidates, employees, course participants, selecting trainees) you may prefer to assign each person a unique Login and Password. **Option Two:** As an alternative, it may be more convenient for the individuals you plan to assess to enter the online system using one Login and Password combination (a universal Login and Password portal). If you use Option Two, the online system will then assign a unique Login and Password when the individual you assess completes and saves their demographic profile information. A more complete discussion of these options is included in your system orientation with our staff and in your support materials.

**Step 2)** Set up the Assessment Assignment: First select the testing instrument to be administered and the time frame during which you want it to be available for the individuals you plan to assess. If you have forgotten how to do this well, call and work with our staff to correctly set up your assignment or follow the guidelines in the help files you were provided during the orientation to your Test Administrator account.
Step 3) Give the individuals you plan to assess their assignment and Login and Password information. Inform them of when and where they may take the assignment(s) online. Do NOT permit them to examine, study, copy, review, or otherwise have access to the assignment other than during their online assessment session.

Instructions for individuals being assessed: There is no need to instruct the individual you plan to assess in the use of the online system. You need only direct them to the Insight Assessment website where they will find the “Test taker Login” button and the remainder of the process is self-explanatory. However, if you would like to distribute instructions with the assessment assignment, the following page is a printable instruction sheet for using the online system. A proctor instruction sheet has also been included in this section in the event that one is required at your organization.

Remember: Check Computers for Readiness

Check each computer for readiness by entering Login “setup” and Password “testing” into the dialogue box on the dark blue screen which appears after clicking the yellow “Test taker Login” button on the right hand side of our Website home page: www.insightassessment.com.

After clicking the button allow, a few moments for the Insight Assessment testing interface to load using Java. If there are any difficulties, run the diagnostic tool by clicking the yellow “Click Here” link on the login screen, or see the PDF of test taker login instructions, with screen shots, located under the “About Us” tab on our homepage. Or contact Insight Assessment for technical assistance.
Instructions for Online System Use

This testing period is timed. The time remaining for completing your assessment is visible on the timer. Please be sure that you allow yourself plenty of time and that you are completing this assessment in an environment where you can work without interruption, and if using a laptop, that you have plenty of battery life to complete the assessment.

1. Open your browser and navigate to our home page:  www.insightassessment.com

2. Click the Yellow “Test taker Login” Button at the top right of the home page.

3. When the dark blue Login screen appears enter the Login and Password you have been given for your assessment assignment:

   Example: Login: XYZabc2013 Password: Graduate13

   Note: If you have any problems with the login, you can check the configuration of your computer by using the yellow “click here” diagnostic on this login screen.

4. To ensure you do not lose your responses, please review the navigational aids on the “Warning” screen and then click “Continue.”

5. Give the system a moment to load Java. You will see a Java logo and progress bar on a white screen.

   Note: Please follow any instructions that may appear asking to “open” or “run” the Java program. If the testing system fails to open, please go to:  https://members.insightassessment.com/Verify?bhcp=1

6. When your personal profile page opens: Respond to all the items on this screen and then click “Save Profile.” You can click “Continue” to move to the assessment itself only after your profile is saved.

7. Select the assessment you have been assigned using the pull down menu, click “Continue.”

8. Accept the User Agreement Terms.

9. Read the instructions and complete the assessment.

10. Depending on the screen resolution of your computer, you may need to use the scroll bar to read the questions and answer choices, or to see the navigational arrows to move from question to question.

12. After completing all the questions, submit your responses by clicking “Done with test/survey” – top left.

13. You can see the time remaining in the timer displayed on the top right of your screen. Your responses will be submitted for scoring automatically if time expires.

14. Once you’ve completed your assessment, you may Log Out, or complete another assessment if one has been assigned, or update your personal profile, or, if the test administrator has authorized it, view and print your assessment results.
Proctor Instructions: Online Assessment Administration

The Insight Assessment Online Testing System is completely self-directed, but to further assist the individuals you are assessing in completing their profile and completing their assessment, you may read or distribute Instructions for Online System Use.

Assure that Computers are ready for testing: Check each computer for readiness by entering Login “setup” and Password “etesting” into the dialogue box on the dark blue screen which appears after clicking the yellow “Test Taker Login” button on the right hand side of our Website home page: www.insightassessment.com. If there are any difficulties, run the diagnostic tool by clicking the yellow “click here” diagnostic link on the login screen, or contact Insight Assessment for technical assistance (650-697-5628).

Beginning Your Assessment Session

1. Direct the individual being assessed to log in from the Insight Assessment home page using the Login and Password which you provide for them.

2. Provide any special instructions you may have received from the administrator assigning the assessment regarding completing the profile. Remind those being assessed to complete and then “SAVE” their personal profile. They will be able to download their assessment(s) only after their personal profile is completed and saved. The profile may include some demographic questions if these have been selected for inclusion by your organization or institution.

3. You may provide this information (optional):

   ✓ questions can be answered in any order and answers can be changed at any time prior to submitting responses
   ✓ the time remaining in the testing session will be displayed on the top right of their computer screen
   ✓ a reminder to use scroll bars if necessary to view the questions, answer choices, and navigation buttons
   ✓ information about whether those being assessed will be able to view or print score reports
   ✓ use of scratch paper is encouraged

4. If necessary, signal individuals when they may begin completing their assessment.

   During the testing period:

Maintain an environment where those completing an assessment will not be distracted.

It is important that proctors do not respond to questions or comments from individuals regarding any of the assessment items, or those seeking to clarify of any of the assessment items. Proctors should not predispose test taker performance by commenting on the assessment or any of any of its questions.
Getting Started

**CapScore™ General Information:** Paper and pencil testing with instruments licensed through Insight Assessment uses the CapScore™ scoring system. All assessments that are administered using paper and pencil materials are scored at Insight Assessment through the CapScore™ scoring system. Reports of the results of administering the assessments are returned to clients as electronic documents. Each new CapScore™ testing system client is invited to consult with our staff to determine how best to use paper-and-pencil testing and the CapScore™ scoring service at their institution or business. If paper-and-pencil testing is the best solution for your institution, agency or business, you will be purchasing all needed assessment materials from Insight Assessment. Rush delivery services are available if required to meet your planned testing date.

**Testing Materials Needed:** Each time you administer an assessment in paper-and-pencil format, the individual you assess should be given a clean, unused booklet and a CapScore™ response form. Quality control audits have shown that when assessments are administered in paper-and-pencil format, those being assessed are accustomed to marking in booklets as they reason through the items, eliminating answer choices that they do not intend to select. To assure booklets are free of comments left by others, new booklets are always supplied with each assessment purchase.

CapScore™ response forms are date stamped to indicate their use period. Service agreements for scoring expire 12 months after purchase. Rush shipment of new booklets and CapScore™ response forms is available.

CapScore™ response forms are coded with assessment name and form and care should be taken to assure that the booklet code matches the CapScore™ response form code. If you are using a variety of assessment forms at your institution, you may have a variety of CapScore™ forms at your agency. **Assure that the code numbers on the booklets match the code numbers on the CapScore™ response forms.** Combining paper and pencil assessment materials from multiple purchases is permissible, so long as the booklets and code numbers match and the assessment materials remain valid (check expiration date on CapScore™ form).

**ID Number Field: Test taker ID Number:** Each CapScore™ response form has a field for the test taker ID Number. It is important that this number be entered on the form correctly as this is the number that will be used to deliver score reports for each test taker. To assure that there is no possibility of confusing the results of your test takers, no two answer sheets should have the same ID number. This ID number might be a student or employee ID number, or a number that is assigned to the test taker solely for the assessment session. Please do not use social security numbers for reasons of personal identity security.

The ID numbers that test takers enter SHOULD IDEALLY BE NINE DIGITS LONG so that all of the boxes are filled. This assists the test taker to observe possible errors in the entry of the ID number. If you wish to use ID numbers shorter than 9 digits, it is best to use leading zeros at the beginning of the number as place holders. We recommend against inviting test takers to make up their own ID numbers, as this often leads to unexpected duplications. IMPORTANT:
Test takers must also darken the bubbles that correspond to their ID number. It is the bubbles that are scanned when reporting score results and bubbles must be darkened well with No. 2 pencils.

We recommend retaining a master list of each person’s name matched with his or her personal ID number. For you to match scores to individuals, test takers need to fill in the ID number section correctly. This master list should be kept in a secure place to protect the privacy of the test takers. This list will be the means by which you will be able to connect the CapScore™ results to the individuals who took the assessment.

**Group Indicator Field:** On each CapScore™ response form there is a two-character or a three-character field that can be used to identify test takers subgroups (a department, an instructor’s section, a course or training program, a number of years of experience, research group, or any other factor or variable that can be coded into three digits). The group indicator field permits 99 two-digit fields or 999 three-digit fields to separate groups within your organization or project.

Using the group indicator field means that there is no need to physically separate response forms by group when returning the batch for scanning and scoring. When scanned as one large batch, the information in the group indicator field will be all that is needed to enable the scoring system to differentiate your assessment scores by group. Basic statistics for each of your groups will be provided as a part of your results package in all cases where the sample size is adequately large (there must be at least 20 test takers in each subgroup).

To use the group indicator field, simply designate a specific number for each group and instruct test takers to enter this number in the “group” field on the CapScore™ response form. For example, you might indicate a pretest group as group 001 and a posttest group as group 002. Or you might designate a different group number for each department in your organization or for each program in your curriculum, or for each section of a course, or each position in a set of job postings. See our website for more on how to identify and differentiate subgroups of test takers within a given batch sent for scoring.
Instructions for Paper and Pencil Administration

Use CapScore™ Paper-and-Pencil Response Forms

1) Begin by filling in the CapScore™ response form with your personal information. (Accommodations may be made for disabled test takers who require assistance with marking CapScore™ response forms.)

2) Be sure to write your ID number in the small boxes along the top of the ID number section and then fill in the corresponding bubbles below each number. Darken in the bubbles completely and correctly.

3) Use only an HB Pencil (#2 pencil in the USA) to complete your CapScore™ response form. Do not use pen. Do not use markers.

4) (Optional) Indicate your group by darkening the appropriate bubbles. Also indicate your gender, class level, and how you identify yourself within the provided categories.

5) (Unless directed otherwise) Write your name and today’s date on your response form.

6) Be sure to completely erase any mistakes or stray marks on your CapScore™ response forms before submitting your completed assessment.

7) Please be courteous to others completing assessments, and avoid causing any distractions. Please turn off all electronic devices.

8) This is a multiple-choice assessment. You should select the one best answer for each question. Record your answers by darkening only one bubble for each item on the CapScore™ response form.

9) Your testing session is timed. Be sure to consider time as you complete this assessment.

10) The assessment proctor will collect your testing materials when the session is over.

Proctor Instructions: Pencil-and-Paper Administration

Testing environments should allow for focused concentration on the assessment and be well lit and comfortable. Individuals completing the assessment should be well rested rather than in a state of cognitive fatigue. All electronic devices should be turned off during a testing session. Adequate time for completion of the assessment should be assured. Time on assessment may be extended if this is appropriate for test takers with documented disabilities.

Before the Testing Period:

1. Bring these materials to the testing room: A fresh clean assessment booklet, a CapScore™ response form, and an Extra HB (USA #2) pencil for each individual completing the assessment.
2. Be aware that CapScore™ response forms must be marked with pencil only. Forms completed with pens or markers cannot be scored.
3. Be sure that the assessment name and code number on the cover of the assessment booklets matches the name and code number on the CapScore™ response forms. If you have been given assessment booklets with code numbers that do not match the code numbers on the CapScore™ response forms, notify your Test Administrator (the individual who has assigned this assessment) or contact Insight Assessment.
4. The testing session is timed. Follow instructions for time allowed. Some individuals may finish early, but many will need this entire period of time to complete the assessment.

5. Additional information is included in the Test taker Instructions. You may wish to read or distribute Test taker Instructions on the previous page.

**During the Testing Period:**

It is important that assessment proctors not respond to questions seeking to clarify any of the assessment’s items. Commenting in any way may predispose test takers toward different responses.

It is also important that proctors do not allow testing materials to be taken from the room. Be sure to give clear instructions about filling in the test taker ID Number and marking all responses clearly. As booklets and CapScore™ response forms are returned, check that test taker ID numbers have been properly entered. When the allowed time period expires, collect all copies of booklets and all CapScore™ response forms and verify the count.

**After the Assessment Session is Complete:**

Store all copies of the booklets and CapScore™ response forms in a secure area. Do not permit access to the booklets or CapScore™ response forms before or after the assessment session. Destroy and recycle the used booklets. Return CapScore™ response forms to the appropriate address for scoring as indicated on the website: www.insightassessment.com.

**Important Notification:** Paper-and-pencil testing purchases include time-limited licenses to use test booklets. All licenses are one-time use only. Insight Assessment retains ownership of all test booklets. The booklets are leased to the client as part of the client’s purchase of test use licenses. Each license includes the right to use the booklet one time and also the scoring and score reporting for that use. The client is directed to destroy the booklets after they have been used once. Purchase of testing is an affirmation that the client understands and will comply with the licensing agreement and protect the security of the testing instrument and all of its questions.

**Scoring Information - CapScore™**

**Returning CapScore™ Response Forms to Insight Assessment for Scanning, Scoring and Results Reporting:** Your purchase of paper-and-pencil testing includes CapScore™ scanning, scoring, and descriptive statistical analysis. Paper-and-pencil testing requires that completed CapScore™ response forms be returned to the company for scoring. Only original CapScore™ response forms can be processed to report your results. Scored results are returned using electronic file transfer. Insight Assessment provides scored data files in PDF and Excel® format. Assessment results are reported to clients by email within 20 working days of receipt of your CapScore™ response forms by Insight Assessment. Rush processing is available if you wish to receive results electronically in 3 working days; additional charges apply.

Please note that CapScore™ response forms are specifically designed and encoded for each Insight Assessment instrument. Only Insight Assessment printed and encoded CapScore™ response forms can be accurately scanned.

Please protect purchased CapScore™ response forms from damage and return them free of stickers, clips, staples or other attachments. Damaged CapScore™ response forms or photocopies of CapScore™ response forms cannot be accurately scanned. Receipt of damaged or photocopied CapScore™ response forms from any customer will result in additional fees and likely delays in delivery of score reports.
Checklist for Preparing CapScore™ Response Form:

- To be sure scores can be reported accurately, check CapScore™ response forms to assure the nine digit ID number section has been bubbled in correctly. Make sure that the written ID numbers match the marks in the bubbles below.

- Send your original CapScore™ response forms back to Insight Assessment for scoring. Make copies of the response forms to ensure that data cannot be lost in transit. Note: these copies cannot be scanned, but they will contain your data in the event that your response forms are lost by the mail services; other scoring arrangements can be made in that event.

- We suggest sending the CapScore™ response forms via registered mail or another secure courier.

- Complete and include the CapScore™ Return Form when sending your CapScore™ response forms for scoring. This form identifies your data and provides a return address for your assessment scores. You can download a copy of this form from the Insight Assessment website: www.insightassessment.com.

- Mail your original CapScore™ response forms to the address indicated on the website:
  Currently, as of the writing of this manual, the address is:

  Insight Assessment
  Attn: CapScore
  1735 N First Street, Suite 306,
  San Jose, CA 95112-4511, USA.

- Only Insight Assessment printed and encoded CapScore™ response forms can be accurately scanned. Photocopied forms will not be scored.

- Use the Group Indicator Field on the CapScore™ response forms to separate test takers into groups for scoring. (See “Group Indicator Field” above.) Note: It is not necessary to physically separate groups using paper clips, rubber bands, stickers, etc. To do so may damage the forms and prevent them from being accurately scored. The Group Indicator Field is intended to identify separate groups within the same batch of test takers. But, if different batches of CapScore™ response forms should be scored separately and results returned separately, send separate CapScore™ Return Forms with each batch indicating the details of your request. Separate batch scoring may incur additional fees for additional scoring passes.

- Your original CapScore™ response forms will not be returned to you. If necessary, these forms can be returned to you upon request, if this request is received within 12 months of scoring. The client will be responsible for any data retrieval, shipping or handling fees that may apply.

Some non-English language CapScore™ response forms are available. Otherwise arrangements can be made to have non-English assessments scored using a spreadsheet method. This is particularly true when new translations are being developed and validated. If you have obtained this scoring contract at purchase use licenses, contact Insight Assessment for instructions when scoring of assessment data is required.
Section 3: Results Reported

This section presents a step by step guide to the interpretation of the scores reported for this instrument. Assessment reporting formats include charts, statistical tables, spreadsheets, and individual reports.

Interpreting CCTST Score Reports

Reports of the scores of individuals are presented in spreadsheets showing all scores and demographic responses for each individual in a group, and as PDF files each showing the scale scores for a given individual. Reports of the scores of groups are presented as PDF files which include statistical tables and bar charts for each scale on the assessment instrument. This section describes each of these types of reports and how to interpret the numerical scores and recommended performance assessment scores displayed.

Each test taken provides you with four types of information about your test takers: An OVERALL Score of critical thinking skill, a recommended performance assessment of the strength of the OVERALL Score ("categorical" or "qualitative" score), the percentile ranking of the OVERALL Score when compared to a group of similar test takers, and a set of scale scores that help you to understand which of the skills areas are particularly strong and which are weaker and require training attention.

Interpreting Individual Test taker Score Reports

The 4 – Step Process

We recommend following a four step interpretation process to fully review all of the information provided by the scores package. Each step provides insight regarding the strength of critical thinking skills in your test takers.

Using this 4-step process will be the same whether your data is gathered online or in paper-and-pencil format. It is also informative to use this process both for individual test taker scores and for interpreting group scores.
Example 1: Interpreting an Individual Score Report

Here is an example of how to interpret an individual score report using the 4-step process. This process is actually quite easy. Use the pictured report (Figure 1 on the next two pages) to see the process in action.

**Step 1: Examine the OVERALL Score.** The OVERALL Score for this example test taker is 87. It is shown on the first page with a brief description of what the OVERALL Score means.

*Session Duration:* It can also be informative to examine the information available regarding testing conditions. This report is of a test completed online where the time on test is captured in the report. The second page of this individual report records the testing “Session Duration” as 40 minutes and 52 seconds, adequate time to complete the test. This means that this test taker took just under 41 minutes to go from opening the first test question until the test taker submitted all responses. The Session Duration does not include time the test taker may have spent completing individual profile demographic questions prior to actually beginning the test itself.

**Step 2: Examine the comparison percentile.** This individual’s OVERALL Score is compared to the 4-year college undergraduate percentiles, and it ranks at the 89th percentile nationally (shown at the top of the first page under the description of the OVERALL Score, and followed by a statement to assist the test taker in understanding the difference between a “percentile” and “percent correct.”

**Step 3: Examine the Performance Assessment of the OVERALL Score.** The performance rating for this individual’s OVERALL Score is Superior. These recommended ratings are based on peer reviewed and internal studies linking scores to learning readiness, academic program completion and work performance. This is determined by Table 3, using the CCTST-N 100-point version cut scores. The Superior Recommended Performance Assessment is also reported to the test taker (First page, first thing under the graphs).

**Step 4: Examine the Scale Scores.** The Scale Scores indicate areas of strength and areas where improvement is needed. The Scale Scores for this individual are presented in both numerical and recommended performance assessment forms. On this test taker’s report the recommended performance assessments for Analysis, Inference, Evaluation, Induction, Deduction, Interpretation, and Numeracy are Superior, for Explanation skills the recommended performance assessment is Strong.
OVERALL: 87  Superior

Overall critical thinking skill that is superior to the vast majority of test takers. Skills at the superior level are consistent with the potential for more advanced learning and leadership.

The Reasoning Skills Overall score describes overall strength in using reasoning to form reflective judgments about what to believe or what to do. High Overall scores are attained by test takers who excel in the sustained, focused, and integrated application of core thinking skills measured on this test, including analysis, interpretation, inference, evaluation, explanation, induction, and deduction. The Overall score predicts the capacity for success in educational or workplace settings which demand reasoned decision making and thoughtful problem solving.

Percentile: 89

A note of interpretation: A score that falls in the 80th percentile indicates that out of one hundred test takers, roughly 40 would earn a higher score and 60 a lower score. A percentile score is not an indication of the percent correct, but of relative ranking. Percentile approximations are suggested for advisory purposes only.

Analysis: 92  Superior

Analytical reasoning skills enable people to identify assumptions, reasons, and claims, and to examine how they interact in the formation of arguments. We use analysis to gather information from charts, graphs, diagrams, spoken language, and documents. People with strong analytical skills attend to patterns and to details. They identify the elements of a situation and determine how those parts interact. Strong interpretation skills can support high quality analysis by providing insights into the significance of what a person is saying or what something means.

Inference: 91  Superior

Inference skills enable us to draw conclusions from reasons and evidence. We use inference when we offer thoughtful suggestions and hypotheses. Inference skills indicate the necessary or the very probable consequences of a given set of facts and conditions. Conclusions, hypotheses, recommendations, or decisions that are based on faulty analyses, misinformation, bad data, or biased evaluations can turn out to be mistaken, even if they have been reached using excellent inference skills.
Evaluation: 88 Superior

Evaluative reasoning skills enable us to assess the credibility of sources of information and the claims they make. And, we use these skills to determine the strength or weakness of arguments. Applying evaluation skills we can judge the quality of analyses, interpretations, explanations, inferences, options, opinions, beliefs, ideas, proposals, and decisions. Strong explanation skills can support high quality evaluation by providing the evidence, reasons, methods, criteria, or assumptions behind the claims made and the conclusions reached.

Induction: 88 Superior

Decision making in contexts of uncertainty relies on inductive reasoning. We use inductive reasoning skills when we draw inferences about what we think is probably true based on analogies, case studies, prior experience, statistical analyses, simulations, hypotheticals, and patterns recognized in familiar objects, events, experiences and behaviors. As long as there is the possibility, however remote, that a highly probable conclusion might be mistaken even though the evidence at hand is unchanged, the reasoning is inductive. Although it does not yield certainty, inductive reasoning can provide a confident basis for sound belief in our conclusions and a reasonable basis for action.

Deduction: 90 Superior

Decision making in precisely defined contexts where rules, operating conditions, core beliefs, values, policies, principles, procedures and terminology completely determine the outcome depends on strong deductive reasoning skills. Deductive reasoning moves with exacting precision from the assumed truth of a set of beliefs to a conclusion which cannot be false if those beliefs are true. Deductive validity is rigorously logical and clean-cut. Deductive validity leaves no room for uncertainty, unless one alters the meanings of words or the grammar of the language.

Interpretation: 88 Superior

Interpretative skills are used to determine the precise meaning and significance of a message or signal, whether it is a gesture, sign, set of data, written or spoken words, diagram, icon, chart or graph. Correct interpretation depends on understanding the message in its context and in terms of who sent it, and for what purpose. Interpretations includes clarifying what something or someone means, grouping or categorizing information, and determining the significance of a message.

Explanation: 84 Strong

Explanatory reasoning skills, when exercised prior to making a final decision about what to believe or what to do, enable us to describe the evidence, reasons, methods, assumptions, standards or rationale for those decisions, opinions, beliefs and conclusions. Strong explanatory skills enable people to discover, to test and to articulate the reasons for beliefs, events, actions and decisions.

Numeracy: 93 Superior

Numeracy skills are used when applying knowledge of numbers, arithmetic, measures, and mathematical techniques to situations that require the interpretation or evaluation of information. Numeracy refers to the ability to solve quantitative reasoning problems, or make judgments derived from quantitative reasoning in a variety of contexts. More than being able to compute a solution to a mathematical equation, numeracy includes the understanding of how quantitative information is gathered, manipulated, and represented visually, such as in graphs, charts, tables and diagrams.

Session Duration: 40 min, 52 sec

Figure 1 Continued: Sample Individual Test Taker Report (page 2)
Interpreting Spreadsheet Score Reports

If you are testing online, you can download individual scores in spreadsheet form. If you are testing in paper-and-pencil format, individual scores are sent to you in spreadsheet form when you return your CapScore™ response forms for scoring. If you are using one of our full-service options, spreadsheet reports are provided as per your original instructions or upon request.

Example 2: Interpreting the Spreadsheet Score Report

Here is an example of how to interpret the spreadsheet report that lists the scores for each of your individual test takers. The partial spreadsheet showing demographic responses, Table 1A below, displays information supplied by the client who administered the test, such as Assignment Description, Assignment Number and Group. And it shows each individual’s responses to questions asking for Name, Email Address, Age, Gender, Ethnicity, and other demographic information which the client test administrator sought to gather using the custom question feature of the testing interface.

In this example, which is a sample of college undergraduates, the client test administrator asked the students to indicate undergraduate year, school, and academic major. Note that in some cases individuals elected not to supply the information requested. One person did not respond to custom question #2 or custom question #3. And that same person elected the system response “I choose not to provide this information” for “Gender” and “Ethnicity.” The other eleven responded to all the demographic questions. For privacy reasons names and emails have been redacted from this example.

<table>
<thead>
<tr>
<th>Assignment Description</th>
<th>Assignment Number</th>
<th>Group</th>
<th>Name</th>
<th>Email Address</th>
<th>Age</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Custom Question 1</th>
<th>Custom Question 2</th>
<th>Custom Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>21</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Business and Technology</td>
<td>Digital Media</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>22</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Business and Technology</td>
<td>Computer Science</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>22</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior</td>
<td>Arts and Sciences</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>24</td>
<td>Female</td>
<td>Asian, Asian American, Pacific Islander</td>
<td>Senior Arts and Sciences</td>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>22</td>
<td>Female</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Arts and Sciences</td>
<td>History</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>2</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>22</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Business and Technology</td>
<td>Finance</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>1</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>24</td>
<td>Male</td>
<td>I choose not to provide this information</td>
<td>Senior Business and Technology</td>
<td>Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>23</td>
<td>Female</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Arts and Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>2</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>25</td>
<td>Female</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Arts and Sciences</td>
<td>Dance</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>22</td>
<td>Male</td>
<td>Black, African American</td>
<td>Senior Business and Technology</td>
<td>Computer Science</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>2</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>30</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Business and Technology</td>
<td>Electrical Engineering</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>25</td>
<td>Female</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Public Health</td>
<td>Exercise Science</td>
<td></td>
</tr>
<tr>
<td>Exit Test</td>
<td>3</td>
<td>Fall 2012</td>
<td>Redacted</td>
<td>Redacted</td>
<td>37</td>
<td>Male</td>
<td>White, Caucasian, Anglo American</td>
<td>Senior Business and Technology</td>
<td>Marketing</td>
<td></td>
</tr>
</tbody>
</table>

Table 1A: Partial Spreadsheet Report of Individual Demographics (right side)
The spreadsheet also includes columns reporting the OVERALL Score, the Comparison Percentile, the Scale Scores, and available information about the testing conditions. Table 1B is an example graphic to demonstrate the interpretation of these scores.

<table>
<thead>
<tr>
<th>Id</th>
<th>OVERALL</th>
<th>Percentile</th>
<th>Analysis</th>
<th>Inference</th>
<th>Evaluation</th>
<th>Induction</th>
<th>Deduction</th>
<th>Percent Answered</th>
<th>Minutes on test</th>
</tr>
</thead>
<tbody>
<tr>
<td>226077</td>
<td>17</td>
<td>62</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>208183</td>
<td>18</td>
<td>59</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>12</td>
<td>6</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>234516</td>
<td>20</td>
<td>72</td>
<td>5</td>
<td>9</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>240221</td>
<td>17</td>
<td>52</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>174608</td>
<td>13</td>
<td>23</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>477990</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>192478</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>433898</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>0.88</td>
<td>29</td>
</tr>
<tr>
<td>234571</td>
<td>21</td>
<td>76</td>
<td>6</td>
<td>10</td>
<td>5</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>159637</td>
<td>31</td>
<td>98</td>
<td>5</td>
<td>15</td>
<td>11</td>
<td>16</td>
<td>15</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>208566</td>
<td>16</td>
<td>40</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>209391</td>
<td>18</td>
<td>59</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>32</td>
</tr>
</tbody>
</table>

**Table 1B: Partial Spreadsheet Report of Individual Scores (left side)**

Table 1B displays test score information about individual test takers. The individual’s OVERALL Score, Comparison Percentile, and Scale Scores are in the columns with the tan header. If this client had chosen to use the CCTST-N, there would be an additional column listing scores for Numeracy. The next column, with the blue header, indicates the percentage of the questions on the test to which the individual responded. “1” means that the individual responded to 100% of the questions. And the right hand column in Table 1B shows how many minutes the test taker spent on the test.

If the client’s test takers completed the instrument using the Insight Assessment online testing system, the numbers reported under the ID variable column represent the unique identifiers created for that individual by our online testing system. If a client using our online testing system wishes to have individual test takers use some other identification number, it is recommended that the client create a custom profile question and inform the test takers how to respond to that custom question. If the score report is produced from paper-and-pencil testing using CapScore™, or if the instrument is administered from within the client’s LMS (learning management system), then the data in this column is the client defined ID.

**Example 2: Interpreting the Spreadsheet Score Report (Continued)**

The **CCTST OVERALL Score is the best overall measure of critical thinking skills when the purpose is to compare individuals or groups of individuals.** The OVERALL Score on this family of critical thinking skills tests has been shown to predict success in workplace contexts, the successful completion of educational programs, and passing scores on certification and licensure examinations.
Step 1: Interpret Each Individual’s OVERALL Score

**CCTST OVERALL Score Interpretation:** Going back to Table 1B, if you examine the CCTST OVERALL Score, you can observe that the CCTST OVERALL Scores for these twelve tests range from 7 to 31. In any sample of test takers there is likely to be a range of values for CCTST OVERALL Score. If you use an agency-specific numerical cut score for the CCTST OVERALL Score at your agency, reference it against the information in the spreadsheet column headed OVERALL for this purpose.

**Examine Any Information Provided About Test-Taking Behavior.** Two columns on the spreadsheet report provide information about test-taking behavior, namely each person’s minutes on test, and each person’s percent answered.

**Minutes on Test:** This is a good time to examine whether the parameters of testing are as expected for each test taker. The CCTST is intended to be challenging. In contrast to reactive thinking or memory recall tests, a test of reflective thinking skills takes a bit of time. Reading test items and responding thoughtfully to each one demands more than 15 minutes of cognitive effort. As a conservative indicator of a false test results, we recommend discarding tests if the test taker gave less than 15 minutes effort.

Table 1B shows that one individual, ID 477990, completed the test in only 15 minutes. This person is not likely to have provided sufficient effort to submit a true test of their critical thinking ability. This person’s CCTST OVERALL Score of 7, and therefore the percentile ranking of 2nd percentile, are very probably falsely low. Individuals spending less than 15 minutes on a skills test, like the CCTST, probably have not given their best sustained cognitive effort, in which case they may not have accurately represented their true level of skill.

**Percent Answered (Ratio):** This column in the spreadsheet reports on the ratio of items answered compared to a test when all questions are answered (ratio = 1). Most people complete all items on the test in the time allowed, but some individuals leave one or more items unanswered. Tests with large numbers of items left unanswered may indicate language comprehension difficulties, reading issues, poor effort, or poor time management.

For Table 1B all but one of the test takers responded to every item on the test. ID 433898 left some questions unanswered as indicated by the reported ratio of .88. Ratios of less than 0.60 (60% of items completed) are unusual, as most test takers complete all questions on the CCTST in the allotted time. Tests submitted with fewer than 60% of items completed may indicate language comprehension difficulties, reading issues, poor effort, or poor time management.

Step 2: Examine Individual Comparison Percentile Scores

**An individual’s Percentile Score is based on that test taker’s OVERALL Score.** The Percentile Score compares the test taker with the external benchmark comparison group (e.g. a national sample of test takers similar to the group being tested). Clients can select a comparison group most like their test sample each time they test a new group of test takers. Within any sample of test takers there is likely to be a wide range of CCTST OVERALL Scores.
and a wide range of the corresponding percentile rankings. If you use an agency-specific percentile cut score for the CCTST, reference it to the reported comparison percentile score.

For example, the comparison percentiles, in the column marked Percentile, for the sample in Table 1A range from the 2nd to the 98th percentile.

A score that falls at the 60th percentile means that roughly 59 people out of 100 will score lower than this test taker and 40 persons out of 100 will score higher than this test taker in the national comparison group.

### Available CCTST & CCTST-N Comparison Percentiles

At the time of this edition of the user manual, the list comparison groups included:

- National technical and community college students (2-yr. colleges)
- National undergraduate students (4-yr. colleges and universities)
- National graduate students and professionals
- National health science undergraduates (4-yr. colleges and universities)
- National health science graduates and professionals
- G835 college graduates and professionals

Check the website for the most recently updated list of available CCTST and CCTST-N comparison groups. Inquire by phone or email about customized comparison groups.

### Step 3: Examine the Performance Assessment for OVERALL to Determine the Strength of the Scores

OVERALL Scores can be interpreted as to their relative strength using recommended performance assessment descriptors. This is useful for studying both individuals and professional cohorts (Table 2).

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Superior</strong></td>
<td>This result indicates critical thinking skill that is superior to the vast majority of test takers. Skills at the superior level are consistent with the potential for more advanced learning and leadership.</td>
</tr>
<tr>
<td><strong>Strong</strong></td>
<td>This result is consistent with the potential for academic success and career development.</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>This result indicates the potential for skills-related challenges when engaged in reflective problem-solving and reflective decision-making associated with learning or employee development.</td>
</tr>
<tr>
<td><strong>Weak</strong></td>
<td>This result is predictive of difficulties with educational and employment related demands for reflective problem solving and reflective decision making.</td>
</tr>
<tr>
<td><strong>Not Manifested</strong></td>
<td>This result is consistent with possible insufficient test taker effort, cognitive fatigue, or possible reading or language comprehension issues.</td>
</tr>
</tbody>
</table>

### Table 2: Descriptions of Recommended Performance Assessments OVERALL Scores
Table 3 displays the Recommended Performance Assessments for the OVERALL Score on the CCTST, CCTST-N, and CCT-G835.

<table>
<thead>
<tr>
<th>CCTST / CCTST-N / CCT-G835</th>
<th>OVERALL Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recommended Performance Assessments</td>
</tr>
<tr>
<td></td>
<td>Not Manifested</td>
</tr>
<tr>
<td>CCTST OVERALL Score 34-point Form 2000 versions</td>
<td>0-7</td>
</tr>
<tr>
<td>CCTST and CCTST-N OVERALL Score 100-point versions</td>
<td>50-62</td>
</tr>
<tr>
<td>CCT-G835 100-point versions</td>
<td>50-65</td>
</tr>
</tbody>
</table>

Table 3: Recommended Performance Assessments for the OVERALL Score

To interpret the strength of the OVERALL Score, use the row in Table 3 that corresponds to the version of the test administered.

For the CCTST / CCTST-N OVERALL Score reported on a 100-point version, a score of 86 and higher indicates critical thinking skill that is superior to the vast majority of test takers and for this reason is designated as Superior. Scores in this range are associated with strong preceptor ratings and work performance and are indicative of leadership potential. On this same 100-point version scores less than 70 display weak overall skill or no manifestation of critical thinking skill and have been associated with poor performance educationally, in the workplace, and on professional licensure examination.

For example, refer again to Table 1B, there the OVERALL Scores for individual test takers ranges from 7 to 31. The test taker score of 7 corresponds to the recommended performance assessment of Not Manifested. The test taker score of 31 on the 34-point version of the CCTST demonstrates superior overall skill in critical thinking.

Comparing all the OVERALL Scores in Table 1B to the Recommended Performance Assessments Table (Table 3), using the 34-point CCTST row in the table, it can be seen that one person did not manifest critical thinking skill, two people displayed Weak overall skill, six fell into the Moderate recommended performance assessment level, two showed Strong overall skill and one displayed Superior critical thinking skill overall. The recommended performance assessments of the individual CCTST OVERALL Scores allows the observation that, with the exception of one score which is not likely to be a true score, this group of test takers demonstrates that they have generally moderate skills, but that a couple of people are weak, a couple strong, and one individual is exceptionally skilled in critical thinking.
Step 4: Examine the Performance Assessment of the Scale Scores

The Scale Scores are useful for identifying areas of strength in the individual and areas of relative weakness that should be addressed in subsequent educational opportunities. Although the specific skill scores reported have internal consistency reliability, test-retest reliability, and strong value as indicators of specific strengths and weaknesses, they are not independent factors; which is theoretically appropriate to the holistic conceptualization of critical thinking as the process of reasoned and reflective judgment, rather than simply a list of discrete skills.

Referring again to Table 1B, examine the individual scale scores for each of the twelve test takers. In each case, use Table 4. Test taker 477990, who submitted a hastily completed test ranking at the 2nd percentile nationally, has scale scores reflecting a recommended performance assessment of Not Manifested in each scale area.

Expanded testing options offering additional scales and alternative score ranges require that recommended performance assessments of your CCTST scale scores be made with a cut score table that corresponds to the form of the test that was administered. Table 4 displays cut scores for interpreting the recommended performance assessment of the 34-point CCTST scale scores, Table 6 does the same for the newer 100-point versions.

<table>
<thead>
<tr>
<th>CCTST (34-point version)</th>
<th>Recommended Performance Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Manifested</td>
</tr>
<tr>
<td>Analysis</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Inference</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Induction</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Deduction</td>
<td>0 - 5</td>
</tr>
</tbody>
</table>

Table 4: Recommended Performance Assessments 34-Point CCTST Scale Scores

Example 2: Interpreting Spreadsheet Score Reports (Continued)

For your convenience, Table 5 below is a reprint of the score report provided in Table 1B. This time there are colors noting the corresponding recommended performance assessments. Blue scores are Strong and red indicate that the specific skill being measured was Not Manifested.
<table>
<thead>
<tr>
<th>Id</th>
<th>OVERALL</th>
<th>Percentile</th>
<th>Analysis</th>
<th>Inference</th>
<th>Evaluation</th>
<th>Induction</th>
<th>Deduction</th>
<th>Percent Answered</th>
<th>Minutes on test</th>
</tr>
</thead>
<tbody>
<tr>
<td>225077</td>
<td>17</td>
<td>52</td>
<td>5</td>
<td>8</td>
<td>4</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>208183</td>
<td>18</td>
<td>59</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>12</td>
<td>6</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>234516</td>
<td>20</td>
<td>72</td>
<td>5</td>
<td>9</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>240221</td>
<td>17</td>
<td>52</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>174608</td>
<td>13</td>
<td>23</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>477990</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>192478</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>433898</td>
<td>12</td>
<td>17</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>0.88</td>
<td>29</td>
</tr>
<tr>
<td>234571</td>
<td>21</td>
<td>76</td>
<td>6</td>
<td>10</td>
<td>5</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>159637</td>
<td>31</td>
<td>98</td>
<td>5</td>
<td>15</td>
<td>11</td>
<td>16</td>
<td>15</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>208586</td>
<td>16</td>
<td>45</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>209391</td>
<td>18</td>
<td>59</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>11</td>
<td>7</td>
<td>1</td>
<td>32</td>
</tr>
</tbody>
</table>

**Table 5: Example of Scale Score Interpretation**

In this small sample there is one individual test taker who is strong in all five of the reported scale areas and one that is strong in two areas. And there is one test taker whose scores on each scale indicate that the skill being measured was not manifested. One person has strengths in Analysis, but difficulties with Evaluation. Other test takers generally score in the moderate range for each scale. In this sample Analysis scores are generally strong. In the next portion of this manual, group scores are examined more closely.

Tables 6 and 7 provide the recommended performance assessments for the 100-point forms of the CCTST scale scores and for the CCT-G835 scale scores.
### Table 6: Recommended Performance Assessments for 100-Point CCTST Scale Scores

These are online versions of the test that offer expanded scale scores. Only the CCTST-N reports a Numeracy score.

<table>
<thead>
<tr>
<th>CCTST and CCTST-N (100-point versions)</th>
<th>Recommended Performance Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Manifested</td>
</tr>
<tr>
<td>Analysis</td>
<td>50-62</td>
</tr>
<tr>
<td>Interpretation</td>
<td></td>
</tr>
<tr>
<td>Inference</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>Explanation</td>
<td></td>
</tr>
<tr>
<td>Induction</td>
<td></td>
</tr>
<tr>
<td>Deduction</td>
<td></td>
</tr>
<tr>
<td>Numeracy</td>
<td></td>
</tr>
</tbody>
</table>

### Table 7: Recommended Performance Assessments for CCT-G835 Scale Scores

These are online versions of the test that offer expanded scale scores.

<table>
<thead>
<tr>
<th>CCT-G835</th>
<th>Recommended Performance Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Manifested</td>
</tr>
<tr>
<td>Analysis</td>
<td>50-65</td>
</tr>
<tr>
<td>Interpretation</td>
<td></td>
</tr>
<tr>
<td>Inference</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>Explanation</td>
<td></td>
</tr>
<tr>
<td>Induction</td>
<td></td>
</tr>
<tr>
<td>Deduction</td>
<td></td>
</tr>
</tbody>
</table>
Interpreting Group Score Reports

Interpreting group score reports follows the same 4-step process used to interpret individual scores. In this case the emphasis is placed on the meaning of the scores for the group as a whole.

**Step 1:** Examine the value of the mean OVERALL Score for the group of test takers.

**Step 2:** Examine the Percentile Ranking, which is the average of the percentile scores of the test takers in this group.

**Step 3:** Determine the strength of the mean OVERALL Score using the Recommended Performance Assessments table.

**Step 4:** Interpret the mean Scale Scores for this group of test takers.

The Table of Statistics and the Group Histogram

Included in the results package for hands on administration is an analysis of the basic statistics describing the score distributions for a group of individuals who completed the same assessment assignment, e.g. a group of exiting students from XYZ University all of whom completed an assignment to take the CCTST online. Table 8 displays statistical information generated from the scores which the members of this group achieved on that assignment.

<table>
<thead>
<tr>
<th>Skill/Attribute Name</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>SE Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>438</td>
<td>75.8</td>
<td>75</td>
<td>7.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Analysis</td>
<td>438</td>
<td>81.0</td>
<td>81</td>
<td>8.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Interpretation</td>
<td>438</td>
<td>81.0</td>
<td>81</td>
<td>8.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Inference</td>
<td>438</td>
<td>78.6</td>
<td>78</td>
<td>7.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Evaluation</td>
<td>438</td>
<td>74.0</td>
<td>75</td>
<td>8.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Explanation</td>
<td>438</td>
<td>74.7</td>
<td>74</td>
<td>10.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Induction</td>
<td>438</td>
<td>79.1</td>
<td>79</td>
<td>7.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Deduction</td>
<td>438</td>
<td>75.8</td>
<td>74</td>
<td>7.8</td>
<td>0.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skill/Attribute Name</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Quartile 1</th>
<th>Quartile 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>58</td>
<td>94</td>
<td>71</td>
<td>80</td>
</tr>
<tr>
<td>Analysis</td>
<td>61</td>
<td>100</td>
<td>74</td>
<td>87</td>
</tr>
<tr>
<td>Interpretation</td>
<td>61</td>
<td>100</td>
<td>74</td>
<td>87</td>
</tr>
<tr>
<td>Inference</td>
<td>61</td>
<td>100</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>Evaluation</td>
<td>55</td>
<td>96</td>
<td>67</td>
<td>80</td>
</tr>
<tr>
<td>Explanation</td>
<td>55</td>
<td>100</td>
<td>68</td>
<td>81</td>
</tr>
<tr>
<td>Induction</td>
<td>58</td>
<td>97</td>
<td>74</td>
<td>84</td>
</tr>
<tr>
<td>Deduction</td>
<td>58</td>
<td>100</td>
<td>69</td>
<td>82</td>
</tr>
</tbody>
</table>

Based on the distribution of the overall score percentiles for the test takers in this group, as compared to an aggregate sample of CCTST Four Year College Students, the average percentile score of this group of test takers is 46.

**Table 8: Group Scores for XYZ University**
Step 1: Interpret the Group’s Mean OVERALL Score

The group’s mean OVERALL Score is the average of the OVERALL Scores for each member of the group tested and the best comprehensive measure of the critical thinking skills of the group as a whole. This number is useful as documentation of the level of achievement of learning goals set for the group as a whole. Examining changes in the mean scores for testing groups over time makes it possible to assess the effectiveness of critical thinking skills staff or student development programs.

Example 3: Interpreting Group Score Reports

For example, the mean OVERALL Score for XYZ University is 75.8. Notice that there are 438 test takers in this sample. We can also see that the OVERALL Scores in the group range from 58 (minimum score) to 94 (maximum score). The 25th percentile for this group from XYZ University is 71 (Quartile1) and the 75th percentile score is 80 (Quartile 3). Figure 2 below displays the score distribution. How should this group of scores be interpreted? Are the scores adequately strong? To answer these questions, complete steps 2-4.

![CCTST Results for XYZ University Undergraduate Sample](image)

Figure 2: OVERALL Score Distribution for XYZ University - Undergraduate Sample
Visit YouTube to view our video on how to interpret Group Score Histograms.

Interpreting Group Score Report Histograms

Step 2: Examine the Mean of the Percentile Scores of the Group

In this case, the scores from XYZ University have been compared to national comparison percentile for four-year college students. This is the comparison group chosen by the client. For other available comparison groups see the previous section of consult our website for the most up to date listing. The percentile reported for the group is the mean of the percentile scores of each individual. In this case the group percentile reported for XYZ University is the 46th. The group as a whole is just below the national undergraduate comparison percentile for critical thinking skills. Although, some test takers in the group are very weak, others are exceptionally strong.

Use the Insight Assessment Report Generator Online

The statistical table group report, the group histogram, and the spreadsheet of individual scores can be created and downloaded by customers using our online system. All completed tests in the selected data set which have at least 60% of the questions answered are included in the analysis.

In the case of testing administered online, as a quality enhancement, only submitted tests where time on test is at least 15 minutes are included in the group analysis. Mean scores are negatively and falsely affected when incomplete assessments are included in the group analysis.

Spreadsheet reports, however, do include all individual test results, regardless of time on test or percent answered. Additional discussion regarding the handling of false test attempts is included below
Step 3: Determine the Strength of the Mean OVERALL Score Using the Recommended Performance Assessments Table

The colored bars indicate how many of the 438 fall within each of the five recommended performance assessment levels identified, with red indicating that critical thinking skills were Not Manifested, orange showing Weak overall skills, yellow indicating Moderate skills, green showing Strong skills, and blue indicating Superior overall critical thinking skills. Using the recommended cut scores that correspond to the 100-point versions of the CCTST (Table 2), Figure 3 shows how the CCTST OVERALL Scores array across the recommended performance assessment levels in this group of test takers. Notice that this is the same CCTST OVERALL Score distribution that was displayed in Figure 2, but this time the recommended performance assessments are marked. Few test takers in this group have scores that are Not Manifested or Weak. Even though the group as a whole scores very near the national mean for its selected benchmark comparison group, there are many scores in the Strong range and also scores in the Superior range.

![CCTST Results for XYZ University Undergraduate Sample](image)

**Figure 3: Recommended Performance Assessments of the XYZ University Sample**

To complete this analysis of the group of 438, we need only to examine the CCTST scale scores to see where this group was particularly weak and where they were strong.
Step 4: Interpret the Group’s Scale Scores for this group of test takers.

Scale scores are important for identifying areas of strength and weakness. When the group is representative of your program or institution or company, your group scores can give direction to the development of programs to help employees and students improve their critical thinking skills. For example, if the group is relatively weak in one or more skill areas (Analysis, Inference, Evaluation, Inductive, or Deductive Reasoning skills), novel scenarios, case studies, or group problem-solving exercises can be designed to emphasize and practice those skills.

<table>
<thead>
<tr>
<th>Skill/Attribute Name</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>SE Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>438</td>
<td>75.8</td>
<td>75</td>
<td>7.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Analysis</td>
<td>438</td>
<td>81.0</td>
<td>81</td>
<td>8.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Interpretation</td>
<td>438</td>
<td>81.0</td>
<td>81</td>
<td>8.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Inference</td>
<td>438</td>
<td>78.0</td>
<td>78</td>
<td>7.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Evaluation</td>
<td>438</td>
<td>74.0</td>
<td>75</td>
<td>8.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Explanation</td>
<td>438</td>
<td>74.7</td>
<td>74</td>
<td>10.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Induction</td>
<td>438</td>
<td>70.1</td>
<td>79</td>
<td>7.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Deduction</td>
<td>438</td>
<td>75.8</td>
<td>74</td>
<td>7.8</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Based on the distribution of the overall score percentiles for the test takers in this group, as compared to an aggregate sample of CCTST Four Year College Students, the average percentile score of this group of test takers is 46.

Table 9 (Reprinted Table 8): Group Scores for XYZ University

Using Table 3 to interpret these OVERALL and Table 6 to interpret the Scale Scores, we see that this group has more strength in Analysis and Interpretation, but weaknesses which can be addressed in Evaluation, Explanation, and Deduction. Here blue highlighted scores indicate that scores fall in the Superior recommended performance assessment level, green shows scores at the Strong level on average, yellow indicates Moderate scores, orange highlights Weak scores, and red indicates Not Manifested.

Looking at the minimum and maximum scores within each skill, we see within each skill at least one test taker who does not manifest that skill and at least one who shows a superior level of that skill.
Q1 scores (bottom 25% of this sample) are, on average, in the *Moderate* range. Q3 scores (top 25% of this sample) are in the *Strong* range for the skill areas Inference, Evaluation, Explanation, Induction, and Deduction and in the *Superior* range for Analysis and for Interpretation.

Half of the sample is strong in Analysis, Interpretation, and Inductive Reasoning. Future training might best be focused on Evaluation skills, Explanation skills, and Deductive Reasoning skills.

Scores for each of the scales are presented in histograms separately in the group report. Above each is a bar that describes the basic statistics for the scale scores. The example below is the Numeracy scale, such as the one included in the CCTST-N instrument. The Numeracy measure, like the other Scale Scores on the CCTST-N, reports scores on a 100-point scale.

By applying Table 8 or by reference to the histogram displayed, one can determine that the group’s mean score of 76.6 falls within the Moderate range. By reference to Table 8 we can infer that the Q1 score of 71 implies that the top 75% of this group of 1005 test takers score in the Moderate range or higher. The Q3 score of 82 indicates that at least the top 25% score in the Strong or Superior ranges. By adding the number of test takers as indicated along the left axis for the orange and red bars, we can determine that roughly 200 of these 1005 individuals have weak numeracy skills or were not able to manifest their numeracy skills. Figure 5 provides a graphic distribution of the Numeracy scores for this example test taker group.

---

**Figure 4: Distribution of Numeracy Scores for ABCD University**

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>SE Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Quartile 1</th>
<th>Quartile 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1005</td>
<td>76.6</td>
<td>77.0</td>
<td>7.4</td>
<td>0.2</td>
<td>51</td>
<td>100</td>
<td>71.0</td>
<td>82.0</td>
</tr>
</tbody>
</table>

**Numeracy**

Numeracy skills are used when applying knowledge of numbers, arithmetic, measures, and mathematical techniques to situations that require the interpretation or evaluation of information. Numeracy refers to the ability to solve quantitative reasoning problems, or make judgments derived from quantitative reasoning in a variety of contexts. More than being able to compute a solution to a mathematical equation, numeracy includes the understanding of how quantitative information is gathered, manipulated, and represented visually, such as in graphs, charts, tables and diagrams.
Figure 5: Distributions of Scale Scores for QRST University

Figure 5 shows individual histograms (bar charts displaying the frequency of Scale Scores for each metric measured by versions of the critical thinking skills tests that include Numeracy). These can be used to display the relative strength of scores in each of the scale areas.
Important Considerations When Analyzing Score Reports

Difference Scores, Gains, Outliers, Discarding False Tests ...

Do specific critical thinking skill scores represent independent factors? No. Here is why. When we talk about critical thinking we are discussing a holistic human reasoning process which results in a singular judgment about what to believe or what to do. Like safe driving, a person can’t just be proficient at the gas pedal skills, and we cannot evaluate gas pedal skills without considering how those skills go into the whole process of safe driving. The two-thousand year old traditional delineation of reasoning skills, which divides them into deductive or inductive, cross cuts the APA Delphi Report’s list of core critical thinking skills. This means that any given inference or analysis or interpretation, for example, might be classified as deductive or as inductive, depending upon how the theoretician conceives of these more traditional categories. Conceptually the skills in the Delphi list are not necessarily discrete cognitive functions either, but in actual practice are used in combination during the process of forming a reasoned judgment, that is critical thinking. Although, in some contexts a given skill can be considered foremost, even though other skills are also being used. For example, a given test question may call heavily upon a test taker’s numeracy skills, while at the same time requiring the correct application of the person’s analytical and interpretive skills. For these reasons, and others relating to test design and cognitive endurance, the questions on the CCTST in its various versions, may or may not be used on more than one scale. As a result, although the specific skill scores reported have internal consistency reliability, test-retest reliability, and strong value as indicators of specific strengths and weaknesses, they are not independent factors; which is theoretically appropriate to the holistic conceptualization of critical thinking as the process of reasoned and reflective judgment, rather than simply a list of discrete skills.

Educationally Significant Gains in Group Mean Scores: A score improvement of even one point for a given individual signifies that this individual correctly analyzed a scenario and identified the correct response while not falling victim to other common reasoning errors presented in other response choices. In some groups some individuals will demonstrate larger gains as the result of an educational program focused and there may be others who demonstrate no improvement. See additional comments below in “Difference Scores”. As a result a mean score improvement for the group of one point from pretest to posttest is indicative of some degree of educationally significant improvement. Larger samples will deliver a statistically significant result (p<.05) with this degree of gain, but the statistical result will not reach the p<.05 level until the gain is approximately 2 in smaller samples because of the mathematics of the statistical analysis.

In general, a 1.0 improvement in the group mean signifies that on average everyone in the group no longer made at least one of the common reasoning errors that result in a flawed problem analysis, inference, decision, and/or evaluation. This is true whether the people in the sample are the same people or consecutive cohorts. The CCTST, in all its various versions, is designed to expose common human reasoning errors, and to improve scores an individual must avoid all likely pitfalls for a given scenario. Raising a group by a point is not educationally trivial, although it often takes a reasonably sized sample to demonstrate this in a statistical test.

As indicated in the “Difference Score” discussion at the end of this section, increases in group mean scores of 2 or more points are evidence of effective training programs. Gains of 4 or more points are exceptional. These difference scores are the most informative data for analyzing a training program’s impact on individual trainee critical thinking skills. On the other hand, losses in scores of 3 or more points are not expected as critical thinking skills are not lost over a short period of time in the absence of cognitive injury. Losses on post-test most commonly indicate that the test taker was not able to give or choose not to give his or her best effort.
Difference Scores – Numerical and Recommended Performance Assessment (Qualitative): When the same individuals have taken the assessment at two time points (before and after a treatment designed to train critical thinking skills), one can measure gains by examining individual difference scores for each individual. \((T_2 - T_1)\) where the “T” stands for “Time”\(^{17}\). These are valuable data for examining the effects of an educational or training initiative. Individual difference scores tend to be rather varied and can be used to further explore the effectiveness of a training intervention. Gains can be easily seen as positive values for ‘X’ in the equation (Score at Time 2 minus Score at Time 1 = X). Negative values are also possible and, if they are true scores, require equal attention. Difference scores obtained in this manner are numerical findings which may or may not be statistically significant. A further discussion of difference scores can be found below.

Gains in Relationship to Sample Size: Sample size is an important factor in statistical analysis. Larger gains are required for statistical significance to be attained in smaller sized samples. A group gain of two points is educationally significant for the group overall and likely represents very significant gains in many individuals within the group. If there are fewer than 30 persons in the group, however, statistical tests will report this range of gain as insignificant numerically.

![Figure 6: Pretest and Posttest OVERALL Scores Comparison](image)

Representativeness: We recommend caution when attempting to generalize from small sample results to assumptions about the population as a whole, unless the sample of test takers is representative of the larger population. For example, the test results from a sample of 200 students, all of whom have volunteered to be tested, may not be representative of the larger population of students. Similarly, test scores from a sample of freshmen who are residential students may not be representative of the larger population of undergraduates if this larger group includes distance learners, transfer students, and adult part-time students.

Independent vs. Matched-pairs Comparisons: Group comparisons can be analyzed statistically in a matched-pairs approach (which associates each individual’s posttest score with his or her pretest score) or, when the groups are not composed of exactly the same set of individuals, as aggregations of scores. When possible, we recommend using the matched-pairs approach for pretest posttest comparisons.

Outliers: ‘Outlier’ is the term used to refer to a data point that is out of scale from the other data in the sample (and therefore possibly less valuable for describing the sample.) But in the case of scores on the CCTST or other

\(^{17}\) For example, in a pretest-posttest design the difference score is the posttest score minus the pretest score, that is \(T_2 - T_1\).
critical thinking skills tests at Insight Assessment, very high and very low scores are not simply outliers. These critical thinking skills tests are constructed to achieve accurate scores throughout the continuum. Outliers should be regarded as true scores unless there is some other reason to regard them as false scores. It is important to remember that there may be other theoretically justifiable and preferable reasons to eliminate scores from the calculation of the group mean, particularly when your data is being used to justify funding or to evaluate the effectiveness of a particular training program (because they are likely to be false scores).

Two justifiable reasons to eliminate scores include 1) tests where less than 60% of the items have been answered (<60% response rate); and 2) time on test of less than 15 minutes (less than the known time needed to read and respond to test items). Either of these would be a justifiable and conservative criterion for determining lack of effort. Information about time on test and percent of completed items is available to clients who test online. While scores for all test takers are included on the Insight Assessment spreadsheet reports, the skills test scores used to create the group score statistical reports from our online testing system automatically eliminate those from test takers who did not spend at least 15 minutes on the test or who responded to less than 60% of the test questions.

Discarding False Tests: Often the group’s mean OVERALL Score for the CCTST / CCTST-N is being used to document an average score for a group after an educational offering. In this case, the tests included in the sample should be tests submitted by test takers who are providing an honest effort as a way of informing the assessment or program evaluation process. Testing designs often treat these tests anonymously or fail to use them for any purpose that affects the individual test taker. As a result, some of the tests may need to be discarded as uninformative to the assessment process. Some individuals lack sufficient internal motivation to engage a cognitively challenging test with genuine effort when they do not see a personal benefit. Instead of refusing to test, the conditions of the educational program may lead them instead to provide a false test (rushed test submission, large number of unanswered questions). Attention to possible false tests:

1. Very low OVERALL Scores should be regarded as true scores unless they can be determined to be false scores. These scores indicate that the test taker has very weak critical thinking skills, and these should not be discarded because they represent true scores in your sample. However, any test score that falls in the lowest percentile range of the relevant comparison percentile group (0-5th percentile) can be examined as a possible false test. Some possible reasons why a very low OVERALL Score might be false include language proficiency problems (contact Insight Assessment for authorized translations of the test) or distractions in the testing center.

2. Spreadsheets downloaded from the online testing system provide information about time on test and the ratio of items completed. Results where time on test is less than 15 minutes or where the ratio of items completed is less than .60 should be examined as possible false tests. These cases are very rare in most datasets. If they are prevalent in your dataset, consult with Insight Assessment staff to assure that you have selected an appropriate form of the test for your test taker group. We consistently see at least 90% of college test takers respond to 100% of the CCTST questions, and at least 95% fill in a response to 90% or more of the CCTST questions, even if they spent less than 15 minutes.

3. When paper-and-pencil tests are scored (CapScore™ results) or when group analyses are performed by Insight Assessment within the electronic testing system, tests with fewer than 60% of the questions answered are dropped from your group.

4. Test retest reliability is very high for the CCTST. If there is no intervening factor, such as a training program aimed at improving critical thinking skills, test takers will likely score within one point of their pretest when retested two weeks later with the same or a comparable version of the CCTST).

5. Scores that drop precipitously at posttest require explanation. Critical thinking skills do not deteriorate over short periods of time, unless there is an intervening cognitive injury or chemical imbalance that impairs
cognition, so the observation of a significant drop in OVERALL Score from pretest to posttest for a given individual is an indicator of a false test at posttest. One can examine difference scores from pretest to posttest (posttest score – pretest score = difference score) and conservatively set a value as worthy of further examination and possibly indicative of a likely false posttest score (any difference score that is equal to or less than -3).

**Meta-cognition:** Deliberative decision making and reflective problem solving, as contrasted with making snap judgments, include the skills of self-monitoring and self-correction when necessary. Often referred to as “meta-cognition”, this feature of critical thinking is dependent on the interplay of the other core critical thinking skills -- evaluating an analysis, explaining an interpretation, or inferring from an evaluation, for example. The OVERALL Score is considered the best estimation of the strength of meta-cognition.

**Proficiency and Competency Testing:** The testing client can determine the operational meaning of “proficient” or “competent” as best fits its needs and purposes in several ways. The client may elect to identify a numerical score, an external percentile score, a recommended performance assessment, a minimum pretest or posttest score, or a locally determined benchmark score which test takers must achieve in order to be regarded as having demonstrated proficiency or competency in critical thinking for the client’s assessment purposes.

### Assessing the Effects of an Educational Program

CCTST scores will improve with the effective training of reasoning skills. There are a number of ways to document quality improvement in critical thinking skills for your institution or organization. One method is to compare the difference in the mean scores for your group at Time-1 (First Assessment: Pretest) with the scores at Time-2 (Second Assessment, occurring after some training program: Posttest). Do this by subtracting the group’s Time-1 mean score from the group’s Time-2 mean score. This method will compare the scores as a whole rather than look at changes within the individual. The expected positive change from Pretest to Posttest will not tell you how many of the individual have improved, nor will it describe the range of improvement made by each individual.

To learn more about the proportion of individuals who have improved and the degree to which they have improved, the best method is to calculate the difference scores from Time 1 (Pretest) to Time 2 (Posttest) for each person you have assessed. The OVERALL Score is the score that is best used to calculate difference scores (difference score = OVERALL Score at posttest minus the OVERALL Score at pretest). Individuals will have made different progress as the result of an educational offering aimed at building critical thinking skills. Some may not have improved their critical thinking skills during the interim time period. If the difference score is at or near zero, they have shown no effect as a result of the educational training program.

A third option is to calculate difference scores for the comparison percentiles reported for each individual at Pretest and Posttest. Example: Improving your group’s overall percentile score from 52nd to 58th percentile demonstrates a significant overall gain in critical thinking scores.

Individual difference scores are the most informative of the effectiveness of training techniques. In any given sample when individuals test twice (‘pretest-before training’ and ‘posttest-after training’), individual difference scores (posttest score minus pretest score) will demonstrate individual gains in critical thinking scores. The demonstration of a two-point gain in OVERALL Score from pretest to posttest is associated with becoming more metacognitive about the reasoning process and with observable evidence of efforts to actively build reasoning skills. Large individual difference scores are observed in most pretest posttest studies for at least some individuals.

Figure 7 below is an example of a graph of difference scores. In this case it is displaying difference scores for the HSRT (Health Sciences Reasoning Test) OVERALL Score. The HSRT is a version of the CCTST designed for use with students and professionals in health care and the health sciences.
Figure 7: Difference Scores Comparing Pretest with Posttest Scores

Increases in OVERALL Scores of 2 or more points (darker blue) are evidence of effective training programs. Gains of 4 or more points (brighter blue) are exceptional. These difference scores are the most informative data for analyzing an educational or training program’s impact on individual trainee critical thinking skills.

Losses in scores of 3 or more points are not expected. Scores or percentiles that drop significantly at posttest are very rare, as critical thinking skills are not lost over a short period of time in the absence of cognitive injury, chemical impairment, or a failure to give or to be able to give best effort. Again, other reported data (less than 15 minutes time on test at posttest or a ratio of items completed that is less than .60 at posttest, both indicative of poor effort at posttest) may explain dropped scores at posttest.
Section 4: Validity & Reliability

This section provides important information relating to the validity and reliability of Insight Assessment’s instruments. Major topics include content, construct, criterion (predictive) validity, internal consistency, and test-retest reliability. Included are hyperlinks to published research reports about the validity and reliability of the instruments.

Content, Construct, and Criterion (Predictive) Validity

At Insight Assessment we take the measurement of reasoning skills and mindset very seriously. Our products measuring reasoning skills and mindset have been studied in a variety of populations and contexts over the past 25 years. In each case, items/scales are piloted in target samples and validated in replicated studies (undergraduate students, graduate students, employees and trainees, military officers and enlisted personnel, children at every K-12 grade level, health professionals across the spectrum of health care disciplines, law students, MBA students, technical and community college students, and the general population) to assure the performance of the assessments in the intended population. Likert style items that measure mindset are grouped in scales with demonstrated validity and reliability and are tested against social desirability bias and cultural bias. Multiple choice items that measure reasoning skills are the result of an item pool tested over a 40-year period to define item difficulty and scale membership. Built on a growing science of the measurement of human decision-making, each instrument has been psychometrically evaluated in collaboration with researchers, educators, trainers, and working professionals, to assure cultural and language competence in the intended test taker group. Validity and reliability coefficients meet the highest standards for all instruments.

Measurement science provides clear evidence that higher-order cognitive skills, such as critical thinking, can be measured validly and reliably by well-crafted multiple choice items. Insight Assessment’s researcher led instrument development program, which began in the 1970s, has demonstrated instrument performance. Our customers rely on this quality in hundreds of independent research studies carried out by researchers and educators throughout the world.

The lead researchers and test developers gratefully acknowledge our many international colleagues who have worked to establish the validity and reliability of the translated instruments, our many health care, business, law, and military professionals who advised on the production of discipline tailored measures and the INSIGHT professional line, and the additional validation work in reading comprehension done by Dr. Joanne Carter Wells of...
California State University Fullerton, and the psychometric consultation and focus on numeracy contributed by Dr. Carol Gittens of Santa Clara University.

The information in this section on validity and reliability applies to all the reasoning skills instruments offered by Insight Assessment, which currently includes the CCTST, CCTST-N, CCT-G835, BCTST, BCTST-N, HSRT, HSRT-N, TER, TER-N, BRT, CCTST M-Series, and the skills sections of two-part tests in the MDCTI, LSRP, TRAA, and INSIGHT series. And it applies as well as the related attribute measures focusing on reasoning dispositions and habits of mind, namely the CCTDI, BAI, CM3, and the first parts of the two-part tests in the MDCTI, LSRP, TRAA, and INSIGHT series. Because skills test questions and attribute measure prompts for all of these instruments are drawn from extensive item pools which have been developed and validated through decades of testing, ease of reading demands that we largely reference only the CCTST in the paragraphs below.

Content Validity

Content Validity refers to the ability of a test to capture a measure of the intended domain. Identification of the pertinent domain, and obtaining agreement on it, are of primary importance to content validation. A second criterion of content validity is assuring that “sensible” methods of test construction are employed. In the case of the CCTST, the specified domain is critical thinking as defined by the Delphi group and discussed in Sections 1 and 5. Critical thinking, as defined by the APA Delphi study, is a construct which integrates a number of cognitive maneuvers known to be a component of this type of human reasoning process. These maneuvers are included in the APA Delphi study report as embedded concepts. Analysis, inference, and evaluation, are examples. Each version of the CCTST is designed as a holistic measure of the construct Critical Thinking, with embedded scales that can be used to examine the embedded concepts as well.

The content validity of the CCTST is further supported by the choice made by educators in the field of human reasoning, researchers and doctoral dissertation scholars studying human reasoning skills, and human resources professionals seeking to hire employees with strong decision skills, who adopt the CCTST. Validity of measurement also requires that the testing instrument must be free of unintended distractors that influence the response choice of groups of test takers and be calibrated to the intended test taker group. Test administrators are cautioned to assure that the CCTST matches the educational and reading level of the planned test taker group.

In all of the California family of critical thinking skills tests, test takers are challenged to form reasoned judgments based on a short scenario presented in the question stem. The CCTST does NOT test any content area knowledge. CCTST questions are framed in the context of everyday concerns. All necessary information needed to answer the question correctly is presented in the question stem. The fact that the CCTST measures only critical thinking and not content knowledge makes it possible to use this instrument as a pretest and posttest to measure improvement in critical thinking that occurs during any educational program or staff development exercise.

For a valid measure of critical thinking, the instrument must present the appropriate range of difficulty for the individual or group being tested to allow the accurate scaling of the score. The CCTST family of critical thinking skills tests is designed to include a correct form of the CCTST to test strengths and weaknesses in critical thinking in a comprehensive range of individuals or groups. Contact Insight Assessment for information about selection of the most appropriate form of the CCTST.

19 Nunnally, Jum C., Psychometric Theory, McGraw-Hill 1978
Language Translations: When an instrument is translated to other languages, methods to maintain the validity of items and scales is an integral concern. Variations in culture have required that some items be changed in the non-English language translations due to idiomatic or cultural interpretation issues, so the various language versions are not completely identical at the item level. However, much care has been taken, through collaborations with international scholars who are native language speakers, and using rigorous iterative translation procedures to assure validity, reliability and cultural competence is achieved in all authorized translations.

Construct Validity

Construct Validity is typically demonstrated by correlational studies where critical thinking scores are correlated with other measures that purport to include the construct. Forms of the CCTST have demonstrated strong correlations with other instruments that purport to include a measure of critical thinking or higher-order reasoning as a component of their scores or ratings. High correlations with standardized tests of college-level preparedness in higher-order reasoning have been demonstrated (GRE Total Score: Pearson r = .719, p<.001; GRE Analytic r = .708, p<.001; GRE Verbal r = .716, p<.001; GRE Quantitative, r = .582, p<.001). A number of these relationships were reported in a large multi-site research study involving 50 programs of health science education assessing students’ critical thinking.  

Evidence for the construct validity of the CCTST (or other forms of the instrument) is provided by the demonstration of improvement in CCTST test scores after participation in a course in critical thinking or an educational program training the critical thinking portion of clinical reasoning. Some selected peer-reviewed publications written by researchers from countries around the world are cited here as examples of how various versions of the CCTST have been used to document gains in critical thinking skills.

In order for this to occur, any improvement in scores must be attributable to improvements in critical thinking and not to some other external factor. In other words, as possible, all variables are held constant with one exception: a treatment is supplied which is expected to increase critical thinking skills. This might be, for example, a staff development program focused on case-based analysis of real problems when the emphasis is on training critical thinking skills, a course in critical thinking that practices students or working professionals in the use of their critical thinking skills, a class or internship focused on training reasoning skills, or some other such treatment. Then, it would be reasonable to expect that improved posttest scores for the same individual or group could be attributed to the effects of the intervention to build critical thinking skills. To maximize quality in the testing condition, consultations with technical staff from Insight Assessment on testing plan design are made available as a part of the new client package when clients are beginning new testing programs.

Comment - Critical Thinking and Grade Point Average: What is the relationship between course grades and critical thinking? Critical thinking skills scores can easily be analyzed in relationship to GPA and many authors have reported this relationship to range from .20 to .46 depending on how much critical thinking skills are being rewarded in the course grades. Stronger correlations are typically reported by STEM educators and by health science educators. Often, however, the other considerations that go into the assignment of grades, including, for example, content knowledge, effort, work product produced, and participation, confound the contribution that critical thinking may or may not be making to that assigned grade. While a meta-analysis of this relationship within a group of programs is useful to examine how well GPA is capturing critical thinking skills, the correlational results discovered are usually more a function of the variance in the GPA variable. Typically, there is little variance in GPA variable rendering it uninformative. Other types of ratings made by trainers, using rating tools, often are more informative of how critical thinking skills are being assessed at the classroom level.

Comment - Age and Critical Thinking: Age is not a significant predictor of critical thinking ability in adults when educational level is controlled and when the sample is drawn from those involved in the workplace or in educational training programs. Not much is known about critical thinking skills in the general population. Children of all ages demonstrate varying ability in critical thinking. The measurement tool must be calibrated to age (grade level) for all but high performance samples in the K-12 population.

Comment – Sex and Critical Thinking: There is no significant difference in scores between males and females in critical thinking skills tests distributed by Insight Assessment. This has been demonstrated in hundreds of thousands of test administrations in all types of population groups. When differences have been observed in small samples, the proportion of males and females in the sample is typically skewed due to some selection effect.

Criterion (Predictive) Validity

Criterion Validity is the most important consideration in the validity of a test. Criterion validity refers to the ability of the test to predict some criterion behavior external to the test itself. For example, the validity of a cognitive test for job performance is the demonstrated relationship between test scores and supervisor performance ratings. In the case of the CCTST, one might want to know that it could predict some meaningful measure demonstrating the achievement of designated learning outcomes or the successful preparation and licensure of key professionals in society, or the successful transition to the workplace. Scores on the various versions of the CCTST have been demonstrated to provide this type of predictive value in peer-reviewed independent published research. The CCTST (and related critical thinking skills instruments) are cited in a large and growing literature, reflecting findings in both the United States and other nations around the world. International research often uses the CCTST (or another related critical thinking skills instrument) in authorized translations. The CCTST is a preferred measure of reasoning skills in recent US National Science Foundation (NSF) grant-funded studies of science education.

Independent, peer reviewed research provides evidence of predictive validity of the CCTST (and other associated critical thinking skills measures). The following links will lead you to a website listing of published independent research documenting the criterion (predictive) validity of the CCTST, studies that use the CCTST to evaluate training techniques, to examine the achievement of learning outcomes, and to study leadership decision-making. Included in this research are doctoral dissertation studies examining critical thinking in relationship to disciplinary

---

training in a wide variety of disciplines. For the convenience of readers who may be reading this User Manual in hard copy, some of these published studies are referenced here.23,24,25 26,27,28

**Internal Consistency Reliability (KR-20, Cronbach’s Alpha)**

Because the CCTST, BCTST, TER, HSRT, Quant-Q, BRT, and the second parts of the LSRP, MDCTI, and TRAA are measures of cognitive skills, the discussion of the Kuder Richardson statistic applies.

The appropriate internal consistency reliability coefficient for the reasoning skills instruments is the Kuder-Richardson test because scoring for these instruments is dichotomous. However, this coefficient is known to underestimate the actual reliability of the instrument when there are fewer than 50 items and when the construct being measured is not highly homogenous.

KR-20’s of .70 are deemed evidence of strong internal consistency in non-homogenous measures. This level of internal consistency is the standard used for development of Insight Assessment critical thinking skills instruments. The OVERALL Scores of all distributed versions of the reasoning skills tests meet or exceed this .70 criterion in the validation samples, and in large model population samples. KR statistics in this range are typically observed in independent samples when the sample size and variance is adequate. Factor loadings for items range from .300 to .770.

As we indicated in Section 4, conceptually, the traditional delineation of reasoning into deductive or inductive cross cuts the APA Delphi Report’s list of core critical thinking skills. This means that any given inference or analysis or interpretation, for example, might be classified as deductive or as inductive, depending upon how the theoretician conceives of these more traditional and somewhat contested categories. Conceptually the skills in the Delphi list are not necessarily discrete cognitive functions either, but in actual practice are used in combination during the process of forming a reasoned judgment, that is critical thinking. Although, in some contexts a given skill can be considered foremost, even though other skills are also being used. For example, a given test question may call heavily upon a test taker’s numeracy skills, while at the same time requiring the correct application of the person’s analytical and

---


interpretive skills. For these reasons, and others relating to test design and cognitive endurance, the questions on
the CCTST in its various versions, may or may not be used on more than one scale. As a result, although the specific
skill scores reported have internal consistency reliability, test-retest reliability, and strong value as indicators of
specific strengths and weaknesses, they are not independent factors; which is theoretically appropriate to the
holistic conceptualization of critical thinking as the process of reasoned and reflective judgment, rather than simply
a list of discrete skills.

Because the CCTDI, CM3, BAI, and the first parts of the LSRP, MDCTI, and TRAA are measures of mindset attributes,
the Cronbach’s Alpha statistic applies.

Cronbach’s Alpha is the appropriate internal consistency coefficient for all measures of critical thinking and
leadership mindset dispositional elements because scoring for these instruments is in Likert Format. Assessment
instruments sold by Insight Assessment meet the threshold for strong internal consistency reliability (a minimum
Alpha of 0.80) and are observed to maintain this performance in all samples of adequate variance.

Internal consistency reliability for the seven individual scales in the initial CCTDI pilot sample ranged from .71 to .80,
with the alpha for the overall instrument reaching or exceeding .91. Strong values have been observed consistently
in samples collected over the past 15 years (ranging from .60 to .78 on the scales and .90 or above for the overall
measure). Lower reliability coefficients are observed in samples where the variance of scores is not large.

Occasionally a customer may require a calculation of the internal consistency reliability coefficient for their own
sample. This is sometimes the case in research studies where the population being measured is atypical in some
respect. When the sample size is adequate to support the analysis (at least several hundred participants advised),
clients may request a custom analysis of the appropriate internal consistency statistic for their study sample.
Additional fees apply.

Test-Retest Reliability

Test retest reliability for all instruments distributed by Insight Assessment meets or exceeds .80 in samples with
adequate variance, retested at two weeks post pretest. Many samples demonstrate no change after far longer
intervals when no active training in critical thinking has occurred between pretest and posttest. This is true for both
measure of reasoning skills and mindset. No statistical evidence of an instrument effect has been observed for any
instrument in internal studies of test retest reliability.

We have observed that measures of critical thinking skills and mindset are very stable over time when there is no
history of training in critical thinking. Test retest coefficients for both mindset and skills instruments are typically
observed to meet or exceed .80 when the Time-2 administration is given two weeks after the Time-1 administration
in samples, and after as long as three years after pretest where there is no on-going educational program.
Published Evidence of Validity and Reliability - Research Reports

Previously we have listed studies that might be helpful to those designing and carrying out studies that assess critical thinking skills. This literature is now quite vast. If you are reading this User Manual as an electronic file, the following links will lead you to our website listing of published independent research documenting the criterion (predictive) validity of the CCTST, studies that use the CCTST to evaluate training techniques, to examine the achievement of learning outcomes, and to study leadership decision-making. If you are reading in hard copy, visit our website through your browser or mobile device and select the “Resources” tab. This area of the site provides you with many teaching and learning materials for classroom and training program development and also abstracts of peer reviewed publications describing studies that evaluate training techniques, studies reporting on learning outcomes assessment, studies linking critical thinking scores to performance ratings, and studies documenting the value of critical thinking scores for admission, student retention, and predicting successful licensure in professional education.

Effective instructional interventions should be expected to have a positive impact on critical thinking. Philip Abrami and several colleagues conducted a meta-analysis, published in the Review of Educational Research, which examined 117 studies involving 20,298 participants. They report an average positive effect size (g+) of 0.341 and a standard deviation of 0.610, with fluctuations in critical thinking effect sizes related to the type of instructional intervention and pedagogy applied. Taken together these findings make it clear that improvement in students' critical thinking skills and dispositions cannot be a matter of implicit expectation...educators must take steps to make critical thinking objectives explicit in courses and also include them in both pre-service and in-service training and faculty development. The conceptualization of critical thinking used in the Abrami et al research is the APA Delphi construct. The same construct as is used in the development of Insight Assessment tests and measures, namely that critical thinking is the process of purposeful self-regulatory judgment focused on deciding what to believe or what to do.

Gains in critical thinking skills and mindset have been reported as the result of effective training programs after as little as a few weeks but more frequently the training program has been several months or longer in duration (a college course or an employee training program, as an example). With focused and effective training techniques, these gains can be extremely significant, particularly in individuals who have not previously reflected on their reasoning process. Many longitudinal studies can be found in the peer reviewed literature documenting gains in critical thinking skills or mindset as the result of curriculum change or training programs designed for employee development. These studies have been conducted in many countries. A classic study using the CCTST was the first to demonstrate this capture of critical thinking skills gains under a wide variety of circumstances. Multiple professional degree granting programs have demonstrated significant gains in critical thinking skills using site-

29 Instructional Interventions Affecting Critical Thinking Skills and Dispositions: A Stage 1 Meta-Analysis. Philip C Abrami; Robert M Bernard; Evgueni Borokhovski; Anne Wade; et al, Review of Educational Research; Dec 2008; 78, 4; Research Library. pg. 1102

30 In the original CCTST validation study, analyses were conducted to investigate whether or not undergraduate students completing a required semester-long college course in critical thinking would show gains in critical thinking skills as compared to students who had not completed such a course. Critical thinking courses in this study had been approved as such by a university committee overseeing the critical thinking educational requirement. This research, which employed a treatment and control group design, used both the cross-sectional and the matched-pairs pretest-posttest measures. Significant gains were seen in both the cross-sectional (t=2.44, one-tailed p < .008) and matched-pairs analysis (t = 6.60, df = 231, p <.001). The average student in the paired sample moved from the 55th percentile to the 70th percentile (posttest percentiles based on the pretest group). The control groups (no specified critical thinking educational intervention) in both the cross-sectional and the matched-pairs experiments showed no significant gains.
specific curriculum in the professional discipline. One longitudinal study documented significant gains at posttest (after a two to three months training program) and the retention of these gains one year later. Many other recent and on-going studies are listed in our Resources section.

In summary, testing instruments sold by Insight Assessment have met the threshold for strong internal consistency reliability (a minimum Alpha of 0.80 for attribute measures and a minimum KR-20 of .72 for skills measures) for their OVERALL Scores, and are observed to maintain this performance in all samples of adequate variance. These standards apply to published versions of the instrument in authorized translations developed in validation studies conducted in collaboration with our international scholar colleagues.


32 This well-designed assessment project is monitoring the effectiveness of a personnel training program designed for US Air Force personnel.
Section 5: Resources and Training Strategies

This section provides some helpful information for teachers and trainers, and also conceptual information for those involved in developing learning outcomes assessment projects. If you are not reading this as a digital file, go to www.insightassessment.com/Resources to find all of these resources posted. We invite you to incorporate these links into program posts for educational purposes to help your trainees obtain the most up to date versions of these materials.

Talking About Critical Thinking

The following collection of links will take you directly to a document that can be used in training programs and courses designed to help students and trainees become more reflective about their thinking and decision making. The documents, essays and discussions listed here are updated and new documents are added periodically. Thank you to these and many other authors for reprint permission of these materials for educational purposes. Thanks to Pearson Education for reprint permission of “Snap Judgments.” If you are not reading this as a digital file, go to www.insightassessment.com/Resources and click on the links under the heading “Talking About Critical Thinking.”

**Critical Thinking: What It Is and Why It Counts**  This essay was written and regularly updated by Dr. Pete Facione. It has been included in many training programs. At the time of publication for this 2016 manual the essay can be downloaded in English, Spanish, and Simplified Chinese.

**Expert Consensus on Critical Thinking**  Information about the APA Delphi Study that resulted in the multidisciplinary consensus definition of critical thinking, and related documents, can be found on this link.

**Characteristics of Strong Critical Thinkers**  This post lists the characteristic of strong critical thinkers identified in the APA Delphi Study. These personal characteristics have since been endorsed by educators, business professionals and civic leaders around the world.
Ten Positive Examples of Critical Thinking At times it is helpful to think about common examples of when critical thinking is most important. This list of ten can help trainees develop a list relevant to their own life and work.

Effective Techniques for Building Reasoning Skills Training reasoning and decision making skills and helping trainees and students to develop a thinking mindset requires that the trainer use effective methods. This list of strategies provides trainers with ideas to help them reframe current teaching and training methods to make them more effective for training critical thinking.

Why Measure Quantitative Reasoning (Numeracy)? Numeracy, the ability to reason in the context of numbers and proportional relationships, is very important in an increasing number of professions. A recent interest in assessing this context of critical thinking is discussed here.

How are educators teaching critical thinking today? This discussion highlights the increasingly pervasive expectation that training processes and group meetings should be more analytical and reflective when group problem solving is occurring.

Can critical thinking be assessed with rubrics? How can a rubric best be used to assess critical thinking? This post discussed optimal measures with rubrics and cautions on misuse.

Snap Judgments PDF Do your trainees understand how humans really think? Can they see the value of training reasoning skills in the context of real life, high stakes decision making? This post is a chapter that presents an exciting discussion about heuristic reasoning from the newest version of the text Think Critically 2016 by Facione and Gittens.

Perspectives that Influence Thinking and Knowing This tool describes seven different ways that individuals see the world. These varying perspectives have a profound effect on how a person interprets new information, identifies problems (or fails to), and determines how or whether the problems can be solved.

Talking Critical Thinking PDF In this allegorical essay, which appeared in Change: The Magazine of Higher Education, we walk side by side with an academic dean who is preparing to explain to the Board of Trustees the importance of critical thinking.

Tips on the Strategy of Interest-Based Negotiation This discussion locates critical thinking in the context of election politics.

Facione: Essays On Liberal Learning and Institutional Budgeting Revamping courses and entire programs is an expensive project. Increasingly, clients are formulating grant proposals for federal assistance to cover the cost of training evaluation projects. Finding the resources is difficult. It is in this spirit that we include these posts.

Terminology for Discussing Critical Thinking The consensus definition of Critical Thinking discussed in Section 1 and derived from the APA Delphi study provides an easily accessible terminology for discussing human thinking processes and habits of mind and for communicating the importance of critical thinking.
in training programs. This accessible terminology is included in Table 4 of the report and appears here with reprint permission. The table can be reproduced for use in educational programs.

Teaching and Training Tools

These live links will connect you directly to posts about measuring critical thinking skills, mindset, leadership, and a number of other related constructs. Thank you to Dr. Carol Gittens (Santa Clara University) for permission to reprint The REWA and the Reflective Log. Thanks to the authors of “Critical Thinking and Clinical Reasoning in the Health Sciences” for their insight on best training practices. Thanks to Drs. Peter and Noreen Facione (Measured Reasons) for reprint of materials used in their training workshops. Thank you to the USAF for the Performance Assessment Rubric. If you are not reading this as a digital file, go to www.insightassessment.com/Resources and click on the links under the heading “Teaching and Training Tools.”

Sample Thinking Skills Questions  The sample skills test questions on this page are intended to illustrate the types of questions which might appear on a generic adult level reasoning skills test.

Sample Items for Measuring Thinking Attributes  The sample “agree-disagree” style items on this page illustrate the types of statements that could appear on a college or adult level measure of critical thinking mindset.

Critical Thinking Insight App  If you are looking for a critical thinking self-test, several are available through the Insight Assessment App.

Holistic Critical Thinking Scoring Rubric (HCTSR)  The HCTSR is a rating measure that can be used to assess the observable critical thinking demonstrated by presentations, reports, essays, projects, classroom discussions, panel presentations, portfolios, and other ratable events or performances. The HCTSR is available for download in several languages.

Professional Judgment Rating Form (PJRF)  The Professional Judgment Rating Form (PJRF) was developed by our research team to make holistic assessments of critical thinking in educational and workplace settings.

USAF Performance Assessment Rubric  This three point rubric rates the process of problem identification and analysis as “EXCELLENT: well defined problem, SATISFACTORY: adequately defined problem’ and ‘DEFICIENT: wrong problem.

Evaluating Written Argumentation (REWA)  This rubric is designed to provide detailed feedback on written material intended to argue persuasively on behalf of a given claim, opinion, or recommendation.

---

33 In addition to downloads from our website, many of the essays and teaching tools listed here can also be downloaded from the authors’ academia.edu postings or from the Measured Reasons website.
Techniques for Trainers of Reasoning Skills and Decision Making

PDF This document is a concise list of valuable training strategies. Use these techniques to strengthen the training strategies you currently use to improve thinking skills and mindset in your trainee and student groups.

Reflective Log This critical thinking tool is intended to give structure and focus to journaling by students or trainees to integrate their insights about their thinking and decision making.

Participant Course Evaluation Form This five-factor tool that can be used either for formative evaluation or to assist with mid-course corrections.

Course Evaluation Design Discussion Questions The assessment research team at Insight Assessment offers this set of guiding questions to faculty and academic leaders seeking an effective and integrated approach to student course evaluations.

Critical Thinking Exam Questions and Study Guides for High Content Courses See how “Why Correct?” and “Why Wrong?” formats convert standard content-based multiple choice items into explanations.

Critical Thinking Requirement Evaluation Guidelines A set of guidelines for evaluating the position of critical thinking as an educational requirement in an institution’s general education or degree program learning outcomes.

Question Asking Skills: A Leadership Training Tool Question asking is key in unfamiliar and uncertain problem situations. Building questioning skills is an important part of training thinking skills.

Training Session Feedback Form This tool is intended to function as both a self-evaluation tool for the trainee and as an evaluation of the training program itself for its ability to engage the learner as intended. Completing the feedback form guides trainees to reflect specifically on their thinking experience related to the learning opportunity.

Strong Critical Thinking in Groups This one page tool guides evaluation of the quality of the thinking and decision making demonstrated by the group process.

The Culture of Thinking in your Organization Use this tool to assess the culture of thinking and decision-making characteristic of your organization.

Designing A Study of Workplace Productivity Use this tool to infuse strong reasoning and decision making into studies of workplace conditions or as an example of how strong thinking and decision skills are embedded in each step of an a well-designed investigation.

Training Critical Thinking and Clinical Reasoning The following best practices essays are excerpted from “Critical Thinking and Clinical Reasoning in the Health Sciences.” Each essay provides an example of training reasoning skills and thinking mindset described by international experts in training clinical reasoning.
Research Findings

Research reports linking key variables to critical thinking are increasing in many disciplines. These peer reviewed publications are written by researchers in a broad range of disciplines located at institutions around the world.

Each entry provides the name of the paper, the author(s), the Journal/Year of Publication and a brief abstract of the publication. Mini titles make it easy to determine if the paper is relevant to your current work. These abstracts are particularly useful to those preparing dissertation studies and proposals for grant funding and federal support.

At the time of this publication **more than 80 research abstracts** are identified for these five topics to facilitate the sharing of these findings. We update the list continuously and encourage researchers to send us notification of their peer reviewed publications. While many of these studies were conducted using instruments in language translations other than English, currently our lists are limited to English language publications. If you are not reading this as a digital file, go to [www.insightassessment.com/Resources](http://www.insightassessment.com/Resources) and click on the links under the heading “Research Findings.”

**Evaluating Training Techniques** This link connects you to a collection of studies describing and evaluating a variety of training techniques for evidence that they effectively train critical thinking skills or mindset.

**Learning Outcomes Assessment** This link connects you to a collection of studies reporting the outcome of assessment projects. Papers from general education projects, STEM education studies, health sciences training projects, and business education curriculum evaluation projects, are included.

**Admissions, Retention, and Licensure** These peer reviewed reports link critical thinking scores to professional licensure exam performance and other indicators of student success.

**Performance Ratings** Increasingly, strength in critical thinking factors into workplace assessment. These studies demonstrate that critical thinking scores are predictive of employer and preceptor ratings.

**Leadership, Skills and Mindset** What are the characteristics desired in leaders and decision makers? This collection of papers examines some potential relationships.
Quotes about Thinking Courageously and Well

“The unexamined thought is not worth thinking.” Pat Croskerry, M.D.

“A mind stretched by a new idea never goes back to its original dimensions.” Oliver Wendell Holmes

“Fix reason in her seat, and call to her tribunal every fact, every opinion. Question with boldness…” Thomas Jefferson

“Nothing in all the world is more dangerous than sincere ignorance and conscientious stupidity.” Martin Luther King, Jr.

“The illiterates of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.” Alvin Toffler

“People can be extremely intelligent, have taken a critical thinking course, and know logic inside and out. Yet they may just become clever debaters, not critical thinkers, because they are unwilling to look at their own biases.” Carol Wade.

“Critical thinking is skeptical without being cynical. It is open-minded without being wishy-washy. It is analytical without being nitpicky. Critical thinking can be decisive without being stubborn, evaluative without being judgmental and forceful without being opinionated.” Peter Facione

“The important thing is never to stop questioning.” Albert Einstein

“The first thing that parents can do is, in accordance with the child’s age, temperament, and capacity, explain, explain, explain. Give reasons for decisions and punishments.” Carol Tavris

“I am convinced that what we believe has to be able to stand the test of evaluation. For example, the idea that teaching should be value free doesn’t make sense.” John Chaffee
Section 6: Customer Relationship

This section provides important legal messages and notifications pertaining to the use of Insight Assessment test instrument use licenses, including the fundamental agreement for the use of testing licenses, non-disclosure and non-compete agreement, buyer qualification, privacy, data security, instrument protection, disability accommodation, and copyrights.

Use Licensure Agreement:

Insight Assessment provides assessment solutions which are single, time-limited instrument use licenses and the related scoring and score reporting services.

Test use licenses, whether for electronic testing or paper and pencil administration, expire 1 year (12 months) after the date of purchase as shown on the invoice. One license to use a test by any means provided, whether by paper or via electronic gateway, (e.g. the Insight Assessment website interface, client LMS, or Insight Assessment personal device app) permits one individual to be tested one time with one test. An electronic test license is considered to have been used when the test questions are downloaded, even if the test taker does not elect to submit responses for scoring. A license for paper-and-pencil administration includes the one time use of a test booklet and a CapScore™ answer form, and is considered to have been used when an answer form is marked and returned for scoring.

Booklets and answer forms and all related delivery solutions are proprietary business properties of Insight Assessment. All clients and their test takers agree to insure the security of testing instruments, whether administered and through paper-and-pencil or online. Client and client’s test takers agree not to reproduce, copy, replicate, image, or publish in any way any testing instrument in whole or in part, to prohibit other from so doing, and to protect and defend copyright as indicated on Insight Assessment testing materials and online interface. Once used paper testing booklets should be destroyed or returned to Insight Assessment, and answer forms should be sent to Insight Assessment for scoring.

Use licenses apply only to Insight Assessment testing materials and their Insight Assessment authorized translations. Insight Assessment reserves the right, at its sole discretion and without the obligation of prior notice or explanation, not to honor requests to purchase licenses to use its instruments and the right to refuse requests to process scoring or to report scores, regardless of the source of such requests. Customer purchase order or valid credit card must be on file for non-prepaid orders. Customer acknowledges, agrees, and authorizes Insight Assessment to charge.
customer’s on file credit card without additional notification for the full balance due on customer’s past due invoices. All sales are final.

**Scoring is done by Insight Assessment only.** The only agency authorized to score and to report scores on Insight Assessment instruments is Insight Assessment. Item level information and response keys are proprietary. Assessments must be administered in accord with the instructions provided in the instrument’s User Manual. Insight Assessment reserves the right not to score data derived from assessment uses not properly administered. Client understands that scales structures and item responses are not reported. Do not duplicate paper answer forms; duplicated answer forms will not be scored. Although the scoring and results are provided by Insight Assessment, all clients and their test takers acknowledge that the interpretation and use of those scores and results is solely the responsibility of the client.

**Ownership and Use of Data Collected and Stored Data in the Online Testing System or Scores through the CapScore™ System:** Data stored in the online system or CapScore™ system is owned by Insight Assessment / the California Academic Press. Online testing system data are released only to the client who contracted to collect or who collected these data, not to any other individual or agency except as may be required by law. It is the client's right to download copies of these data for their use. Scored CapScore™ data will be transmitted only to the client or the agent designated by the client on the written CapScore™ Return Form in the format requested (hard copy or electronic files – additional fees may apply to requests for hard copy reports). The responsibility for privacy protection of data downloaded by clients from the Insight Assessment /the California Academic Press testing system or returned as digital files from the CapScore™ system rests entirely with the client. Additional requests by the client for analyses of stored data and the retransmission of these data or these analyses to clients must be prearranged by written request from an authorized individual client or client agency.

**Aggregate Information:** Although Insight Assessment / The California Academic Press publishes aggregate comparison percentiles for its products, it does not disclose personal information associated with any dataset involved in this process. CapScore™ clients are permitted access only to data collected at their own agency by themselves. Data collected by two separate clients at the same agency must be shared by the agency itself. Insight Assessment / the California Academic Press does not undertake consolidation of data even when requested by one of the agency clients unless the request comes from all clients at the agency. This service would constitute a separate contract and require permissions from all involved clients.

**Non-Disclosure & Non-Compete Agreement:** By accessing the Insight Assessment online testing interface or purchasing a preview pack or instrument use licenses, all clients acknowledge that the online interface and the testing instrument(s) it contains or displays include proprietary business information, such as but not limited to the structure of test questions or the presentation of those questions and other information displayed in conjunction with the use of this testing interface. In the absence of a specific written agreement between the client and Insight Assessment, the client agrees that by purchasing a preview pack or testing licenses, the client and their organization, shall not disclose, copy, or replicate this testing interface or this testing instrument(s) in whole or in part in comparable or competitive product or interface of any kind. In the absence of a specific written agreement between the client and Insight Assessment, the client agrees that by accessing the testing instrument(s) for any purpose, including but not limited to previewing the instrument(s), the client and the client’s organization shall not create, design, develop, publish, market, or distribute any comparable or competitive testing instrument(s).
Privacy Policy

Insight Assessment, a division of the California Academic Press, endorses the standards of the American Psychological Association in the use of individual difference data gathered during the testing of human subjects. Toward this end, and to maximize the ethical use of data collected as a function of the use of our products, we require purchasers of our products to provide evidence of their qualification as a test administrator. Qualification includes but is not limited to persons who hold jobs requiring testing activity: human resource professionals, staff development professionals, teachers, university faculty, researchers, counselors, clinical assessment staff, institutional research staff, etc.

Graduate students who wish to purchase products from Insight Assessment / the California Academic Press must provide information regarding the testing credentials of their advisors as well as the assurance from advisors that the testing and data management will be in accordance with the ethical treatment of human subjects and protection of data. If more information is needed about purchaser qualifications for our products, please contact Insight Assessment / the California Academic Press, 1735 N 1st Street, Suite 306, San Jose, CA 95112-4529, USA. info@insightassessment.com or use our ‘Contact Us’ window on the website. Insight Assessment reserves the right to discontinue services or decline purchase requests in the event that there is reason to be concerned that doing otherwise would compromise the security of a measurement tool.

The protection of personal privacy related to the action of collecting data or using individual or summary data by clients is the responsibility of the client, whether they are individuals or agencies. Insight Assessment / The California Academic Press does not assume responsibility for the maintenance of personal privacy related to the actions of clients in the collection, storage, or use of data derived from the use of our products.

Our privacy policy prevents publication of the actual names of institutions whose data are included in each comparison percentile project. Within the aggregated dataset, samples are from liberal arts colleges, land grant institutions, technology institutes, community and technical colleges, schools of the arts, research intensive universities, professional preparation programs, and other educational institution types. The samples are drawn from small and large colleges and universities, both public and private. In the case of the profession specialized versions, such as the HSRT or the BCTST, norm samples also strive to represent the various disciplinary areas as possible.

Access to Client List Information: Insight Assessment / the California Academic Press considers its client list to be proprietary and private and does not release lists of clients to any other individual or agencies except as may be required by law. It does not provide lists of clients to buyers or to prospective or current clients. Disclosure of stored client account information to the client themselves is permitted for the purposes of assuring accurate record keeping.
Data Security

In keeping with the concerns about the impact of the expansion of electronic networks on information privacy, and congruent with the ethical considerations of research on human subjects, Insight Assessment / The California Academic Press maintains strict adherence to the protection of all personal data analyzed and stored as a function of purchasing our products. This document outlines the policies and procedures for the protection of personal data related to the purchase of products by our clients, the integrity of the online testing system data, and the transmission of CapScore™ test taker data to clients, whether these clients are individuals or agencies.

Assessment construction and validation is conducted under the highest psychometric standards of each type of instrument. General psychometric information is reported in each assessment manual. Limited psychometric information is available to clients for research support purposes. Translation colleagues are provided with psychometric analyses of their validation sample datasets.

Notice: For assessment security reasons, information on assessment item construction, instrument structure and scale structure are not released as a component of testing service purchase.

Protection of Testing Data Collected through any Insight Assessment / the California Academic Press Online or Electronic Testing Systems or Data Scored and Stored Through the CapScore™ System: Access to a client’s electronic data bank is protected with a client login and password system. Access to the client database is therefore limited to persons at the client organization who have knowledge of the login and password information for the client account, and to technical staff at Insight Assessment / the California Academic Press, who provide technical support to the client in their use of the online testing system or other Insight Assessment data collection or electronic testing systems. The protection of the Account Administrator login and password is the responsibility of the client. Changes to the client login and password code can be made by the client at any time for added security to the data stored in the client account. Protection of these codes, and thus the security of access to data in the client account, is the responsibility of the client. Insight Assessment / the California Academic Press does due diligence in the protection of access to its database servers, and maintains the highest standards in data protection.

Attention to data security also pertains to data collected or transmitted when: 1) establishing client accounts for the purchase of products; 2) processing bank transfers, checks, electronic payments, or purchase orders; 3) providing test taker access to products in electronic or paper-and-pencil format; 4) delivering testing to clients and test takers of clients; 5) the shipment of products; 6) transmission of scores; 7) return of scored assessment forms to clients; 8) assistance to test takers using the online testing system; 9) assisting clients to manage the online testing system.
Instrument Protection

Insight Assessment is a distributor of time-limited licenses to use high-quality tests and surveys and is committed to delivering those tests and surveys in an accurate and timely manner. Insight Assessment is also committed to providing clients with accurate reports of scores and other demographic data and survey results as entered by test takers in response to the questions on their assigned tests or surveys. The following notices are hereby published and made public as inclusive with the purchase of licenses to use Insight Assessment tests.

Notice: Customers who purchase use licenses and testing services assure Insight Assessment that:
- Provisions will be made to guarantee instrument security. All copies of paper-and-pencil measurement tools will be kept in secure locations before and after testing.
- Online Login and Password information will be kept in secure locations before and after testing.
- Damaged or unusable paper-and-pencil assessment instruments will be shredded or disposed of in ways that do not compromise instrument security.
- Client acknowledges that Insight Assessment retains ownership of paper assessment booklets and online tests which are shipped to or used by the client testing.
- Copyrights will not be violated. No portion of any assessment may be reproduced in any format without the specific permission of Insight Assessment.
- No copies of the assessment, in whole or in part, will be made. No assessment questions will be duplicated or distributed or published in any way that has the potential to compromise the security of the testing instrument.
- Neither the tests nor the assessment results are sold or made available for sale in the absence of a specified reseller contract.
- Assessments will be administered in accord with the procedures specified in this assessment manual.
- Assessment instruments and results will be used in accord with accepted ethical standards for the testing of human subjects.
- Assessment data, score interpretation, and use are the sole responsibility of the client and end-user.

Notice: Insight Assessment reserves the right to withhold testing and scoring services or assessment score results for any client, test taker, or other user who does not abide by the terms and conditions of this purchase agreement, presents invalid CapScore™ response forms for scoring, misrepresents or falsifies responses to assessment questions, attempts to acquire or to distribute assessment questions or scales or answer keys, or who otherwise violates any of these terms or conditions. Insight Assessment reserves the right to discontinue services or decline purchase requests in the event that there is reason to be concerned that doing otherwise would compromise the security of any of its measurement tools.

Notice: Insight Assessment is not responsible for verifying either the identity of the test taker or the truthfulness or accuracy of demographic or other information as entered by test takers. Insight Assessment is not responsible for the conditions under which tests are administered or taken. Detailed instructions for test administration are published in the assessment manuals which are part of each assessment’s preview pack.

Notice: Purchasers and users of Insight Assessment measurement tools incur by virtue of their purchase of said tools certain obligations and responsibilities, which are specified on our website. See www.insightassessment.com

Notice: Clients are solely responsible for the transmittal of the original CapScore™ response forms for scoring. It is recommended that clients retain copies of these forms to protect against loss of CapScore™ response forms during shipment for scoring.
Notice: Clients are solely responsible for storage of returned CapScore™ results, data, and datasets. If requested, Insight Assessment will search its CapScore™ data archives and retrieval datasets for clients. Contact Insight Assessment for cost information.

Notice: Although all reasonable precautions are taken to ensure assessment security, Insight Assessment is not responsible for violations of copyrights or for the unauthorized distribution of any version of any assessment, or for any information about any assessment, whether this information be accurate or inaccurate. Insight Assessment will vigorously prosecute the unauthorized publication of information about any version of any of its tests to the full extent of the law.

Notice: Clients and test takers are solely responsible for the interpretation and use of assessment scores, survey results, demographic information, or related descriptive information or statistical analyses as may be gathered, displayed, downloaded, or otherwise generated by Insight Assessment. User clients and user test takers agree to hold Insight Assessment, its officers and staff members, individually and jointly, harmless of any liability or responsibility, financial, personal, or otherwise, for the use or the misuse of any Insight Assessment gathered, displayed, analyzed, downloaded, or otherwise generated assessment scores, survey results, demographic information, or related descriptive information. See www.insightassessment.com

Notice: Except for prepaid testing contracts and unexpired quotes, prices are subject to change without notice.

Notice: Clients are hereby notified that the California Academic Press LLC, d.b.a. Insight Assessment owns the data derived from its online e-testing system and from CapScore™ and uses those data for research purposes such as the development comparison percentiles for various groupings of institutional types on various testing instruments, e.g. "US undergraduate student percentiles on the BCTST." Insight Assessment is committed to maintaining individual and client confidentiality of E-Testing and CapScore™ data and datasets.

Sale of Use Licenses for Testing to Qualified Buyers Only: For reasons of assessment security and to protect the testing programs of our institutional and industry clients, we restrict purchase of certain of our testing licenses to qualified professionals and researchers. Employers, human resource directors, assessment directors, university academic administrators, professors, teachers, personnel trainers, staff development professionals, and their agents may purchase measurement tools published by Insight Assessment. Sales staff may require evidence of credentials for access to assessment license purchase. See additional notifications relating to the sale and use of testing instrument licenses below.

Notice: Insight Assessment reserves the right not to sell to qualified individuals who are enrolled in degree programs which use these tools for high-stakes testing purposes or who are employees of client organizations that use our tools for high-stakes testing purposes.

Notice: Insight Assessment does not sell or supply testing materials for the purpose of psychometric analysis, validation of competing instruments, or as specimens in research methods or instrument development courses.

Notice: Insight Assessment expects that clients will adhere to ethical standards for the use and interpretation of standardized tests.

Notice: Insight Assessment reserves the right, at its sole discretion and without the obligation of prior notice or explanation, not to honor requests to purchase and requests to process scoring or report scores on its instruments regardless of the source of such requests.

Notice: In all testing situations, compliance with the requirements of the Americans with Disabilities Act is solely the responsibility of the purchaser of tests and testing services.
**Notice:** Doctoral Dissertation students may receive access to purchase test use licenses from Insight Assessment. Access to Insight Assessment testing instruments is made available to doctoral level students conducting dissertation research after application for this access is made to the company. Doctoral students are afforded a large research discount covered by internal grant funds. Supervision of these student researchers is the responsibility of sponsoring advisors. Any violation of the purchase contract is the responsibility of the supervising professor and the degree granting institution.

**Notice:** Dissertation Advisors / Committee Review or IRB Committee Review -- IRB committee review of instruments can be provided through the online testing system only if protection of the instrument is assured by the dissertation director. Instrument validity and reliability precludes any editing or deleting of individual questions or assessment items.

**Notice:** When filing a dissertation: It is NOT permitted to file a copy of any Insight Assessment instrument along with the dissertation unless the library will assure, in writing and under signature of the library director, that they will not distribute this copy as a part of the dissertation (neither by digital scan nor by hard copy) even if it is requested by other scholars. To include one of our testing instruments or any of the items it contains in a copy of a dissertation which is then distributed to a third party is both a violation of copyright and a violation of the contractual agreement for protection of the instrument that is assumed by the user at purchase.

**Notice:** No actual assessment questions or assessment items from the instrument may be included within any research report of studies that use one or more of the Insight Assessment testing instruments. The inclusion of any actual assessment items in a publication is both a violation of copyright and a violation of the contractual agreement for protection of the instrument that is assumed by the user at purchase. When discussing the instrument in your published paper, you may include verbatim excerpts from the assessment manual, properly cited. You may also use one or more of the example items posted on our website to help your reviewers and readers understand the nature of the instrument.

## Disability Accommodation

Decisions about how to accommodate test takers with documented disabilities are the sole responsibility of the purchaser. Insight Assessment is not aware of any limitation in the accommodations required for disabilities and should be notified should the purchaser discover any.

Suggested strategies for the accommodations of test takers with disabilities include, but are not limited to, allowing the test taker additional time to complete the assessment and reading assessment questions to the test taker. If a reader is used, the reader should not attempt to interpret, explain, or clarify assessment items.

To the extent that the documented disability involves cognitive processes needed for problem analysis and problem solving, there is no appropriate accommodation as the tests themselves are designed to be a measure of relative performance in this regard.

The accommodation of individuals with disabilities does not relieve the customer of the terms and conditions in the sales contract relating to the security of testing instruments: no duplication, capture, copying, digitalization, capture of assessment items as part of an accommodation, nor administration of the assessment through software programs that are not a part of the Insight Assessment testing systems is permitted. No tests may be transferred to other file forms or modalities.
Copyright Notices

Notice: All persons, including purchasers, reviewers, client users, and test taker users are hereby notified that Insight Assessment tests, testing materials, computer-based assessment and survey software, and the testing or survey content delivered in paper form or by means of this software are protected by copyright law and international treaties. All copyrights worldwide are reserved. Insight Assessment E-Testing software, and its code, images, and web content are protected by international copyright (c) 2002, 2006, 2008, 2009, 2010, 2012, 2015, 2016 held by the California Academic Press LLC, d.b.a. Insight Assessment. All rights worldwide are reserved.


Notice: Instruments online or as paper booklets, assessment questions, assessment items, answer options, and answer forms may not be duplicated, copied, replicated, digitized, posted, displayed or reproduced in whole or in part in paper or electronically, or by any means without the prior written consent and agreement of the copyright holders, author(s), and publisher. Assessment items may not be posted on either the public or any internal Internet. By purchasing assessment use licenses and their related assessment scoring and score reporting services buyer certifies that he/she has read, understands, and accepts the notices, advisories, and the purchaser requirements as indicated at the Insight Assessment website, the instrument manual, the price quote, and the sales order. The buyer and buyer’s organization agree that by accessing Insight Assessment testing instrument(s) for any purpose, including but not limited to previewing the instrument(s), neither the buyer nor the buyer’s organization shall create, design, develop, publish, market, or distribute any comparable or competitive testing instruments for a period of up to four years from the date of the most recent access to digital or paper versions of any Insight Assessment testing instrument(s).

Notice: All persons are hereby notified that any unauthorized reproduction or distribution of any part of this e-testing software, or any assessment or survey, or any response form delivered or made visible in paper, electronic, Internet, PDF, email, or in any media by any means whatsoever or any question or answer, or any part thereof, is a violation of said copyright or copyrights and may result in severe civil and criminal penalties. Insight Assessment will defend its copyrights and the copyrights of its assessment authors vigorously, and will prosecute violators to the maximum extent under the law.

Notice: By accessing the Insight Assessment e-testing system, user acknowledges that this computer-based assessment/survey software and the testing or survey content delivered by means of this software is protected by copyright law and international treaties. User agrees that reproduction or distribution of any part of this e-testing software or any assessment or survey delivered or made visible in any media by means of this software, or any question or answer, or any part thereof, is a violation of said copyright or copyrights which may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.