California Critical Thinking Skills Test

CCTST Test Manual

“The Gold Standard” Test of Critical Thinking
Ethics of Performance Testing

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Priority of the Current Update

This update supersedes all earlier versions of this test 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 testing 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 test 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 the testing instrument(s) this test manual supports are invited to request a complimentary copy of the most updated version of this test manual. To receive your updated copy of this manual simply phone Insight Assessment at 650-697-5628 or email us at contactus@insightassessment.com.

Test Manual Editor and Project Director: Noreen Facione
Content Management and Web Coordination: Kathryn Winterhalter
Editorial Support: Mark Kelly
Design: James Morante
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Section 1:

Critical Thinking: Important in Learning - Important in Life

Why Train and Measure Critical Thinking?

Many people think it is obvious who the best thinkers are in a given agency or institution, but this impression is based on long-term observation and hindsight, a luxury that can no longer be afforded when error rates are already in question and where poor judgments lead to irreparable damage and even cost lives. At all ages of life, critical thinking skills and habits of mind are needed by each of us when solving problems and making decisions that affect ourselves, our families, our country and our world. 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.

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. Studies 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 try to understand problems and how they actually 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 more positive dispositions toward thinking and reasoning. An honest and concerned appraisal of the variances in critical thinking skills and dispositions manifested in working adults and students in all programs of study, and focused response to any demonstrated strengths and weakness in critical thinking is a pathway to future growth and achievement for individuals and for society as a whole.

Weak critical thinking skills show themselves in many ways: dangerous and costly errors, repeated mistakes, bad decisions, failed systems, inaction when action is needed, the giving of bad advice, inaccurate assumptions, the poor design of training programs, the poor evaluation of educational curricula, the lack of anticipated action… the list is long.

Students and workers who enter with weak critical thinking skills 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 risks increases 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 skills.
Human reasoning and problem solving are highly complex processes, but not impossible to analyze, measure and improve. A measure of critical thinking that describes an individual's comparative strength in critical thinking is a valuable aid in determining a person's capacity to benefit from training or to succeed in their job.

Today, educational programs and workplace training programs are being required to demonstrate that they are effectively improving critical thinking skills. Individual measures of critical thinking ability (analysis, inference, evaluation, inductive reasoning and deductive reasoning) provide valuable information about potential hires and guidance as to where to dedicate programs of improvement in workers and students.

Weakness in critical thinking leads to...

* failure to learn * confused and confounded communication * job loss * lost revenue* patient deaths * ineffective law enforcement * gullible voters * imprisonment * prejudice * higher combat casualties * upside down mortgages * thoughtless criticism * vehicular homicide * heart disease * unplanned pregnancies * financial mismanagement * family violence * repeated suicide attempts * drug addiction * ... * ...

“What was I thinking?”

“How could I have decided to do that?”

“Why didn’t we do more about that problem while we still could?”
APA Delphi Study Consensus Definition of Critical Thinking

“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 definition. 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 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 nearly synonymous 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.

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 Topics of Interest Section of this test manual. The well-known description of critical thinking skills (APA Delphi Report, Table 4) and the definition of the “ideal critical thinker” is included there. That discussion also provides a more complete account of the origin of this now global description of critical thinking and how it has been embraced by professionals, educators and civic leaders around the world.

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, 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.
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, explaining or predicting events or behavior.¹

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?²

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.” ³ 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.⁴ 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.5

Given the central importance of numeracy, Insight Assessment is proud to offer augmented versions of our most popular skills tests which report scores on numeracy as well as critical thinking:

BCTST – N  
CCTST – N  
CCTST – MIB  
CCTST – M25  
TER – N  
HSRT – N

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 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, for purposes of education and educator training, can be found on our website: www.insightassessment.com.
Section 2:

Measuring Critical Thinking

Development of the California Critical Thinking Skills Tests (CCTST Forms)

The CCTST is the product of research aimed at measuring high-stakes reasoning and decision making processes. The item pool for the CCTST has been growing for more than 40 years and continues to evolve as new studies are completed. Using the APA Delphi Consensus Definition of Critical Thinking to categorize and refine the item pool, and a continuing series of instrument development projects at varying educational levels, across varying disciplines, and in various languages, there is now an array of CCTST instruments. If the APA Delphi definition of critical thinking describes the reasoning skills you plan to assess in candidates, trainees, students, or working professionals, the CCTST will be an effective measure of critical thinking for your project.

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. Forms of the CCTST are designed to 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.

The validation studies of the first generic forms of the CCTST were conducted using a case control methodology in college-level institutions in California, and these studies lead to the first publication of the generic 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 and the highest level of practicing professionals.

Items contained in the CCTST (all forms) are tested for their ability to discriminate well between individuals when the items are taken as a group in the reasoning skills overall measure (Overall Score) and also selected for their strength in validly measuring the emphasis areas of Analysis and Interpretation, Inference, Evaluation and Explanation, Inductive Reasoning and Deductive Reasoning (scale scores). The resulting CCTST instruments constitute a rich and robust collection of tools for evaluating critical thinking skills in a variety of test-taker populations.

On all forms of the CCTST, the test items range in difficulty and complexity. Together the items provide a measure of overall critical thinking and a measure of five or more useful skill descriptions that can be used to guide staff development and curriculum development. 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 instrument is typically administered in 45-50 minutes. There are varying numbers of items on each form, but in each case the length of the instrument is set to permit maximum performance within the range of possible effort for the intended test-taker group. Each item requires that the test-taker make an accurate and complete interpretation of the question.

The 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 testing 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.

Research and testing of the item pool is ongoing. The item pool now includes forms of the CCTST in more than 12 languages and also forms of the test that are used to measure critical thinking skills by Business (BCTST), Military Science (MDCTI), Legal Studies (LSRP) and the Health Sciences (HSRT). The Test of Everyday Reasoning (TER) versions of the CCTST provide versions of the test for secondary school students, community and technical college students, and testing the adult general public.

Authorized Translations of the CCTST

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.

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: www.insightassessment.com
CCTST Score Array

All versions of the California Critical Thinking Skills Test provide an overall measure of critical thinking skills. In the case of the generic CCTST, this score is called the CCTST Overall Score. This score is qualitatively interpretable as Superior, Strong, Moderate or Not Manifested, and these recommended performance assessments are based on both independent research in teaching and learning and in workplace transition, and on internal data analyses from available datasets. A percentile ranking is also reported, if it is available. The percentile ranking of the group is determined by averaging the percentile scores of each test-taker in the group. All individual and group scores are reported.

All versions of the CCTST also provide an array of scale scores describing strengths and weaknesses in various skill areas. 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). Earlier versions of the CCTST and current paper-and-pencil versions of the CCTST provide the following scale scores to inform test administrators of these relative strengths and weaknesses.

- Analysis
- Inference
- Evaluation
- Induction
- Deduction

Versions of the CCTST published after 2010 provide the following individual scale scores:

- Analysis
- Interpretation
- Inference
- Evaluation
- Explanation
- Induction
- Deduction
CCTST Scale 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.

INFERENCE: 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 must probably be true based on analogies, case studies, prior experience, statistical analyses, simulations, hypotheticals,
and familiar circumstances and patterns of behavior. As long as there is the possibility, however remote, that a highly probable conclusion might be mistaken, the reasoning is inductive. Although it does not yield certainty, inductive reasoning can provide a solid basis for confidence in our conclusions.

**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.

**CCTST Versions that Include a Measure of Numeracy**

Reasoning in mathematical contexts (Numeracy) is an important component of business education and a key skill for the business professional. 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 links the CCTST (critical thinking skills) with a separate measure of Numeracy. Numeracy is vital for business success in today’s heavily quantitative business decision making environment. 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 .

**Testing Individuals with the CCTST**

Individual test-taker scores provide key information for advising and mentoring. Whether you are hiring a new employee or admitting a new trainee, an assessment of the personal strengths of the candidate helps to direct training resources and improves the likely success of the training program.
• **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, and individual skills assessment informs them about what types of thinking exercises will be most beneficial to them in particular.

• **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.

• **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.

• **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.
Testing Groups with the CCTST

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 percentile norms 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 a professional training program or an educational preparation 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 percentile norms 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.

- **Admissions – Example:** When programs are in high demand and student retention is a factor in assuring that institutional goals for meeting workplace demands are met, adding a measure of critical thinking to the admissions profile assists with the admission of a training group who are ready to benefit from your educational training program.
Test within Your Learning Management System (LMS)

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.
Section 3:

Test Results Reporting

Assessment Report Package

The goal of any testing project should be to obtain high-integrity data that provides specific and relevant information that can further the goals of the individual, program or organization being studied. Data must be presented in formats that inspire new insights and drive evidence-based decision making. Each Insight Assessment test instrument has been crafted to provide a wide range of information, statistical and demographic, about individuals and/or test-taker groups.

Scoring and Results Reporting Included with Purchase: Scoring and results reporting are included in the purchase price for all testing options. The assessment report package included with your testing purchase provides the CCTST Overall Score for each test-taker, a recommended performance assessment of the CCTST Overall Score, a norm referenced percentile ranking for each test-taker, scale scores for each test-taker and, for customers testing groups of test-takers, descriptive statistics and graphic representation of collective test-taker critical thinking scores, and descriptive statistics of the demographic characteristics of your test-taker group (if collected).

Individual scores are used in advising, placement, hiring, and personal development. Percentile rankings can be used to estimate the strength of the group in relationship to norm comparison groups on this instrument. The group statistics make it possible to observe a group over time (pretest and posttest analysis), or to compare one group to other similar groups (previous cohorts or groups with other key characteristics), or to analyze in a group of test-takers the relationship of critical thinking skills to some other key measure or variable.

Electronic tests are scored within the testing system and results are available to the test administrator immediately upon upload of the completed test. Online testing makes it possible to retrieve results as soon as your test-taker has completed the test. Getting started with online testing includes a personal orientation to your test administrator account in the online testing system and information about score retrieval (individual reports or spreadsheets of group data). Paper-and-pencil tests are scored at the company and results are returned to you in digital format. Refer to the other sections of this test manual for more details on test administration.

Basic Assessment Report Package

- Numerical CCTST Reasoning Skills Overall Score
- Overall Score Percentile Ranking
- Numerical CCTST Scale Scores
- Recommended Performance Assessments for Overall and for each Skill Scale

CCTST-N Scores Reported:

- All CCTST Scores plus a score for Numeracy
Norm-Referenced Scores

Why Norm-Referenced Scores Are Important: CCTST mean scores from individual institutions vary widely, depending on the institution or agency. For colleges and universities, selectivity of admissions is a significant influence on mean scores. For workplace settings, the job class of the worker is often a significant influence on the mean scores for the employee group. Comparison of individual and group scores to a national sample of test-takers similar to those tested at your agency provides a way to judge the strength of critical thinking against an external standard.

Norm-Referenced Examples to Consider: If your test-taker can be appropriately compared to a CCTST national norms comparison group, a percentile ranking score will be reported for your test-taker as a part of your assessment report package. Because the percentile score is related to the overall score, the percentile score is given in the column to the right in the overall score on the score report spreadsheet. This percentile ranking indicates the relative strength of this test-taker when compared to others like them. In particular, if you have tested a graduate-level professional, and the national percentile ranking for that professional’s raw CCTST Overall Score is the 68th percentile, then this professional has scored higher on this test than 68 of every 100 professionals who test nationally in the United States.

As another example, if the mean of the percentile scores of your group of test-takers’ is at the 50th percentile in relationship to similar test-takers, then your group is performing as well on average as a nationally representative sample of students or working professionals in overall critical thinking skills. In rare cases, your testing group may be so unique that there is no available aggregate norm to use as a comparison group; In this case you may wish to have one created for you. The development of a custom comparison norm group for your sample is available as a custom assessment report option. Contact Insight Assessment for a quote on the cost of this service.

How Norms Are Calculated: The CCTST has been used to assess overall critical thinking skills in hundreds of thousands of individuals representing a wide variety of test-taker populations. These test-taker groups provide normative percentiles against which you can benchmark your sample of test-takers. Norms for all of the California Critical Thinking Skills instruments are derived from the aggregated data pool of all test-takers. Test data is aggregated from randomly selected and weighted subsamples drawn from several hundred institutions from all geographic areas of the country, and from all 50 States. The actual algorithm for the calculation of norms is proprietary. The published norm percentiles for each comparison group are re-examined annually using data from only the previous three years to determine if there has been a significant change in the national distribution of scores for the test-taker group in question. Typically, norms within a group of test-takers (e.g. four-year undergraduate students) are observed to be very stable nationally, but occasionally adjustments are made to assure that the published percentiles are accurate. Previously published norms are adjusted as necessary when there is a significant difference observed from those previously published.
Customized Assessment Reports

Insight Assessment clients can customize their assessment report package with additional analyses, graphics, and interpretative text discussing your scores in relationship to your particular goals and objectives. Customers might choose a customized report to prepare results for a stakeholder meeting or agency conference. Customers who use our instruments as student learning assessment tools can commission a report that can be integrated into their self-study reports and distributed to faculty, students and benefactors.

When the speed of results delivery is critical, consult with our staff for information about available options to bring you immediate results. When high-stakes decisions depend on the depth of interpretation of your data or its presentation, the best option might be to arrange for more customized test results delivery.

**Solutions that Work for You:** Whether you are testing inside your company or half way around the globe, individual candidate reports of your applicants’ critical thinking skills are delivered to your designated contact when applicants complete their testing.

Customized assessment report options offer staff support from Insight Assessment to set up your testing plan and schedule your results reporting to match your organization’s needs. Customized reporting options can include periodic, in-depth group analysis reports, custom graphics suitable for inclusion in client reports, consultations regarding data management, preparation of local or regional norms for group comparison, analyses of group differences within a client’s dataset, and report preparation of testing statistics for funding agencies and stakeholder groups. Contact Insight Assessment for more information on any of these or other requested services.

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**Results When You Need Them to Support Your Hiring Decisions**

*Making an optimal hire depends on having all essential information about the candidate at your fingertips. Hire for strength in thinking and problem solving.*
Section 4:

Interpreting Test-Taker Score Reports

Each test taken provides you with four types of information about your test-takers: An overall score of critical thinking ability, a recommended performance assessment of the strength of this overall score, the percentile ranking of this 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.

We recommend the following four step process to examine each of these types of information because each can provide 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.

Overview of the 4 – Step Process

**Step 1:** Interpret the value of the CCTST Overall Score and information reported about testing behavior.

**Step 2:** Examine the Percentile Ranking that represents the average of the percentile scores of each member of the group tested.

**Step 3:** Determine the strength of the CCTST Overall Score using the recommended performance assessment table.

**Step 4:** Interpret the CCTST scale scores.

**CCTST-N:** Interpret the Numeracy Score.

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**Scores for the CCTST**

**CCTST Reasoning Skills Overall Score**

**Percentile Ranking & Categorical Score**

**CCTST Scale Scores & Categorical Scores**

**CCTST-N Versions:**

**Numeracy Score**
Interpreting Individual CCTST (-N) Score Reports

Example 1 shows how to interpret individual test-taker scores reported in spreadsheet form. If you are testing online, individual scores are downloadable 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, online testing results can be provided to you in spreadsheet form.

The spreadsheet files capture all the score and demographic information for each test-taker in a given group. Table 1, below, illustrates the full array of columns in a typical spreadsheet report of individual test-taker information. In this example, information is provided on each person in a group of 12 test-takers. For ease of reading, Table 1 is presented in parts below. The left half is Table 1A, the right half is Table 1B.

Table 1A, the left hand side of Table 1, shows the test scores. Table 1B, right hand portion of the same spreadsheet, shows the responses test-takers made to demographic and identifier questions.

Step 1: Interpret Individual CCTST Overall Scores

The CCTST Overall Score is the best overall measure of critical thinking skills when the purpose is to compare individual students, candidates, staff or program applicants with national performance standards on the instrument. The test-taker’s Overall Score on this family of critical thinking skills tests has been shown to predict success in workplace contexts and the successful completion of educational programs, certification and licensure examinations.

Table 1: Example Spreadsheet Report of Individual Test-Taker CCTST Scores
### Table 1A: Partial Spreadsheet Report of Individual Test-Taker CCTST 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>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>206183</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>159837</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>18</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>

This partial spreadsheet example, Table 1A above, displays test score information about individual test-takers. The individual’s Overall Score, Percentile, and scores on each skill are in the columns with the tan header. 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 1A shows how many minutes the test-taker spent on the test. The “ID” variable in the left hand column is a unique identifier assigned automatically to each test-taker by the Insight Assessment testing interface.

The partial spreadsheet showing demographic responses, Table IB below, displays information supplied by the test administrator, such as Assignment Description, Assignment Number and Group. And it shows the test-taker responses to questions asking for Name, Email Address, Age, Gender, Ethnicity, and other demographic information which the test administrator sought to gather using the custom question feature of the testing interface. In this example, which is a sample of college undergraduates, test administrator asked the students to indicate undergraduate year, school, and academic major. Note that in some cases individual test-takers elected not to supply the information requested. One test-taker 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 1B: Partial Spreadsheet Report of Individual Test-Taker CCTST Demographics

<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>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>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>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>24</td>
<td>Female</td>
<td>Asian, Asian American, Pacific Islander</td>
<td>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>Female</td>
<td>White, Caucasian, Anglo American</td>
<td>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></td>
<td>I Choose not to provide this information</td>
<td>Senior</td>
<td></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</td>
<td>Criminal Justice</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</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>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>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>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>Business and Technology</td>
<td>Marketing</td>
<td></td>
</tr>
</tbody>
</table>

CCTST Overall Score Interpretation: Going back to Table 1A, 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.

Also Examine Any Information Provided About Test-Taking Behavior. In this case the spreadsheet is reporting testing results from the online testing system. Two columns in the spreadsheet provide information about test-taking behavior.

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.
Minutes on Test For Example 1: In this case, there is one test-taker, ID 477990 who completed the test in only 15 minutes. This test-taker is not likely to have provided sufficient effort to submit a true test of their critical thinking ability. This test-taker’s CCTST Overall Score of 7, and therefore the percentile ranking of 2nd percentile, are very probably falsely low. *Individuals spending fewer 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 test-takers complete all items on the test in the time allowed, but some test-takers 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.

**Ratios for Example 1:** Examining the “Percent Answered” column on Table 1A we can see that all but one of the test-takers responded to all items 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 Norm Percentile Scores**

A test-taker’s Percentile Score is based on that test-taker’s Overall Score. The Percentile Score compares the test-taker with the external benchmark norm comparison group (e.g. a national sample of test-takers similar to the group being tested). Clients can select a norm 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 percentile norm score.

**Example 1 Norm Percentile Interpretation:** The norm 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. For more information about norm comparison groups, see section 3 of this test manual.
Step 3: Determine the Strength of the CCTST Overall Score Using the Recommended Performance Assessments

Examination of CCTST Overall Scores in relationship to other external criteria and published research supports the use of cut scores as indicators of likely performance. Previous test manuals have proposed three recommended performance assessments (Strong, Moderate and Weak) and have commented on very low scores as possibly indicative of false tests. This manual refines the cut scores to include both the recommended performance assessment of Not Manifested to indicate very weak scores (not consistent with expected scores for the intended test-taker group), and Superior to identify those test-takers who score among the best in the intended test-taker group.

Descriptions of recommended performance assessments are displayed in Table 2. Table 3 below outlines the scores in each recommended performance assessment level.

Table 2: Descriptions of Recommended Performance Assessments Overall Scores

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior</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</td>
<td>This result is consistent with the potential for academic success and career development.</td>
</tr>
<tr>
<td>Moderate</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>Weak</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>Not Manifested</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>

Recommended Numerical Cut Scores for Recommended Performance Assessment of the CCTST Overall Score: In Table 3, numerical cut scores for determining recommended performance assessments are presented for the CCTST (2000 forms, 34-point scale and the 2010, 100-point scale forms) both of which are college-level versions of the CCTST. This table also includes the cut scores relevant for the CCTST-G835 form of the test, relevant to higher performance groups and doctoral-level academic groups. Additional tables are available for other versions of the CCTST (translations, M-Series, profession-specific versions).
Table 3: Recommended Performance Assessments for the CCTST Overall Score

<table>
<thead>
<tr>
<th>RECOMMENDED PERFORMANCE ASSESSMENTS</th>
<th>CCTST Overall Score – Recommended Performance Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Scores</td>
<td>Not Manifested       Weak   Moderate     Strong    Superior</td>
</tr>
<tr>
<td>CCTST Overall Score 34-point Form 2000 versions</td>
<td>0-7     8-12    13-18</td>
</tr>
<tr>
<td>CCTST and CCTST-N Overall Score 100-point versions</td>
<td>50-62   63-69   70-78</td>
</tr>
<tr>
<td>CCTST- G-835 100-point versions</td>
<td>50-65   NA      66-74</td>
</tr>
</tbody>
</table>

Recommended cut scores are determined on the basis of performance of the intended test-taker group and differ by test form. To interpret the strength of the CCTST Overall Score, use the line in Table 3 that corresponds to the form of the test administered.

For the CCTST Overall Score reported on a 100-point version, a score of 86 and higher indicates a consistent strength in all critical thinking skill areas 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 of the CCTST, 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.

Example 1 (Continued) - Recommended Performance Assessment of CCTST Overall Scores: Refer again to Table 1A where CCTST Overall Scores for individual test-takers range 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 the CCTST Overall Scores in Table 1A to the recommended performance assessment table (Table 3), using the CCTST 2000 Forms (34-point scale) line 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: Interpret the CCTST Scale Scores**

The purpose of the CCTST scale scores is to identify areas of strength in the individual and areas of relative weakness that should be addressed in subsequent training opportunities.

Referring again to Table 1, 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.

**Recommended Performance Assessment for the CCTST Scale Scores:** Expanded testing options offering additional scales and alternative score ranges introduced in the years 2000 and 2010 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 CCTST scale scores for the CCTST Form 2000 versions of the instrument.

**Table 4: Recommended Performance Assessment CCTST 2000 Scale Scores (34-point version)**

<table>
<thead>
<tr>
<th>RECOMMENDED PERFORMANCE ASSESSMENTS</th>
<th>CCTST 2000 (34-point version) Scale Scores</th>
<th>Recommended Performance Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCTST Scale Scores</td>
<td>Not Manifested</td>
<td>Moderate</td>
</tr>
<tr>
<td>Analysis</td>
<td>0 - 2</td>
<td>3 - 4</td>
</tr>
<tr>
<td>Inference</td>
<td>0 - 5</td>
<td>6 - 11</td>
</tr>
<tr>
<td>Evaluation</td>
<td>0 - 3</td>
<td>4 - 7</td>
</tr>
<tr>
<td>Induction</td>
<td>0 - 5</td>
<td>6 - 11</td>
</tr>
<tr>
<td>Deduction</td>
<td>0 - 5</td>
<td>6 - 11</td>
</tr>
</tbody>
</table>
Example 1 (Continued) - Interpretation of CCTST Scale Scores

Table 5 is a reprint of the score report provided in Table 1A. This time there are colors noting the corresponding recommended performance assessments. Blue scores are \textit{Strong} and red indicate that the skill being measured was \textit{Not Manifested}.

### Table 5: Example of CCTST Scale Score Interpretation (Form 2000, 34-point version)

<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>174698</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>5</td>
<td>10</td>
<td>5</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>159607</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>

In this small sample there is one individual test-taker who is \textit{strong} in all five of the reported scale areas and one that is \textit{Strong} in two areas. And there is one test-taker whose scores on each scale indicate that the skill being measured was \textit{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 CCTST G-835 scale scores.
Table 6: Recommended Performance Assessments for the CCTST Scale Scores (100-point versions). These are online versions of the test that offer expanded scale scores.

| RECOMMENDED PERFORMANCE ASSESSMENTS CCTST Scale Scores (100-point versions) | CCTST and CCTST-N (100-point versions) Recommended Performance Assessments |
|---|---|---|---|---|
| | Not Manifested | Weak | Moderate | Strong | Superior |
| Analysis | | | | | |
| Interpretation | | | | | |
| Inference | | | | | |
| Evaluation | | | | | |
| Explanation | | | | | |
| Induction | | | | | |
| Deduction | | | | | |

Table 7: Recommended Performance Assessments for the CCTST G-835 Scale Scores (100-point versions). These are online versions of the test that offer expanded scale scores.

| RECOMMENDED PERFORMANCE ASSESSMENTS CCTST G835 Scale Scores (100-point versions) | CCTST G-835 Recommended Performance Assessments (100-point versions) |
|---|---|---|---|---|
| | Not Manifested | Moderate | Strong | Superior |
| Analysis | | | | |
| Interpretation | | | | |
| Inference | | | | |
| Evaluation | | | | |
| Explanation | | | | |
| Induction | | | | |
| Deduction | | | | |
CCTST-N: Interpreting the Individual Numeracy Score

The CCTST-N reports scores on a 100-point scale. If you are administering the CCTST-N, you have received a score for Numeracy for each of your test-takers. The strength of individual scores for Numeracy can be interpreted using the recommended performance assessments in Table 8.

Table 8: Recommended Performance Assessments for Numeracy on the CCTST-N

<table>
<thead>
<tr>
<th>RECOMMENDED PERFORMANCE ASSESSMENTS</th>
<th>CCTST-N (100-point versions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeracy Scores</td>
<td>Recommended Performance Assessments</td>
</tr>
<tr>
<td>Not Manifested</td>
<td>Weak</td>
</tr>
<tr>
<td>Numeracy</td>
<td>50-62</td>
</tr>
</tbody>
</table>

Example 2 offers one more look at the 4-step process for individual test scores. The process is actually quite easy, as can be seen by comparing this information with Figure 1 (On the next page.)

Step 1: The CCTST Overall Score for this example test-taker is 82. It is shown on the first page and also near the bottom of the second page with a brief description of the CCTST Overall Score. The second page of this individual report also records Time on Test as 42 minutes and 42 seconds, adequate time to complete the test.

Step 2: This test-taker’s CCTST Overall Score is compared to the 4-year college norm group and ranks at the 76th percentile nationally (shown near the bottom of the second page).

Step 3: The Recommended Performance Assessment corresponding to a CCTST Overall Score of 82 is Strong. This is determined by Table 3, using the CCTST 2010, 100-point version cut scores. The Strong Recommended Performance Assessment is also reported to the test-taker (Second page – in the area describing CCTST Overall Score).

Step 4: The scale scores for this test-taker are also presented in both numerical and recommended performance assessment forms for the test-taker. The recommended performance assessments for Induction, Evaluation and Explanation CCTST scale scores are Superior for this test-taker. Analysis, Interpretation and Deduction are Strong, and the recommended performance assessments for Inference is Moderate.

On the next page, Figure 1 is an example of an individual test-taker’s CCTST score report. This report is an example of the report that is pushed to your designated email contact with customized reporting options. It is also much like the report that you can make available to test-takers when they test online (optional at your preference), or the report that can be downloaded for each test-taker as part of the assessment report package, using our online testing system.
The California Critical Thinking Test (CCTST) is an objective measure of the core reasoning skills needed for reflective decision making concerning what to believe or what to do. This instrument invites test-takers to apply their skills to information provided in a variety of different scenarios.

<table>
<thead>
<tr>
<th>%</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td>82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OVERALL: 82**

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.

Strong overall critical thinking skills, consistent with the potential for academic success and career development.

**Induction: 87**

Decision making in contexts of uncertainty relies on inductive reasoning. We use inductive reasoning skills when we draw inferences about what we think must probably be true based on analogies, case studies, prior experiences, statistical analyses, simulations, hypotheticals, and familiar circumstances and patterns of behavior. As long as there is the possibility, however remote, that a highly probable conclusion might be mistaken, the reasoning is inductive. Although it does not yield certainty, inductive reasoning can provide a solid basis for confidence in our conclusions.

Superior

**Deduction: 79**

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 clear-cut. Deductive validity leaves no room for uncertainty, unless one alters the meanings of words or the grammar of the language.

Strong

**Analysis: 80**

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.

Strong
Inference: 78

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.

Moderate

Evaluation: 82

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, 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.

Superior

Interpretation: 80

Interpretive 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.

Strong

Explanation: 100

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.

Superior

Percentile: 76

CCTST Four Year College Students

A note of interpretation: A score that falls in the 60th 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.

Session Duration: 42 min, 42 sec

Figure 1 Continued: Individual Test-Taker Report (page 2)
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 CCTST 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 CCTST Overall Score using the Recommended Performance Assessments table.

**Step 4:** Interpret the mean CCTST scale scores for this group of test-takers.

**CCTST-N:** Interpret the mean Numeracy score for this group of test-takers.
Example 3 illustrates how to interpret group scores for the CCTST: This example uses a score report for the 2010 online CCTST (100-point version). Table 9 is an example report of group scores for a group of test-takers from XYZ University.

Table 9: Group Scores for XYZ University

<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.

NOTE: As of 2013, when time-on-test and percent-of-questions answered data are available, group reports include only those tests where at least 60% of the questions were answered and at least 15 minutes of effort was recorded.

Step 1: Interpret the Group’s Mean CCTST Overall Score

The group mean score for the CCTST Overall is the average of the overall scores for each member of the group tested and the best overall 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.
The mean CCTST Overall Score for XYZ University is 75.8. Notice that there are 438 test-takers in this sample. We can also see that the CCTST 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 (Quartile 1) 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**

<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>438</td>
<td>75.8</td>
<td>75.0</td>
<td>7.2</td>
<td>0.3</td>
<td>58</td>
<td>94</td>
<td>71.0</td>
<td>80.0</td>
</tr>
</tbody>
</table>

**Figure 2: CCTST Overall Score Distribution for XYZ University - Undergraduate Sample**

**Step 2: Examine the Percentile Ranking that Corresponds to the Group’s Mean CCTST Overall Score.**

In this case, the scores from XYZ University have been compared to national norms for four-year college students. Using the CCTST Overall Score mean for this test-taker group, the percentile reported for the XYZ University scores is the 46th percentile nationally. This group of test-takers is comparable to the norm group selected, the mean scores are similar and the range of scores is as well. 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.
**Step 3: Determine the Strength of the Mean CCTST Overall Score Using the Recommended Performance Assessments Table.**

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)

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 CCTST Scale Scores

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, or Inductive or Deductive Reasoning skills), novel scenarios, case studies, or group problem-solving exercises can be designed to emphasize and practice those skills.

Table 10 (Reprinted Table 9): Group Scores for XYZ University

<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>76.8</td>
<td>78</td>
<td>7.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Evaluation</td>
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<td>74.0</td>
<td>75</td>
<td>8.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Explanation</td>
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<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.

Using Table 3 to interpret these CCTST 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 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.

![Graphs showing frequency distribution of CCTST scale scores for XYZ University](image)

*Figure 4: Distribution of CCTST Scale Scores for XYZ University*

Figure 4 shows individual histograms (bar charts displaying the frequency of CCTST Scale scores) for each of the scale areas for the CCTST (100-point versions). These can be used to display the relative strength of scores in each of the scale areas.
Interpreting Group Numeracy Scores

The Numeracy measure reports scores on a 100-point scale. If you are administering the CCTST-N, you have received group scores for Numeracy.

Figure 5 is an example of how Numeracy Scores on the CCTST-N are reported. 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 5: Distribution of Numeracy Scores for XYZ University
Important Considerations When Analyzing Score Reports

**Individual Gains:** When the same individuals have taken the test at two time points (before and after a treatment designed to train critical thinking skills), one can measure gains by examining difference scores for each individual ($T_2 - T_1$).

**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.

**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.

**Aggregate 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.

**Discarding False Tests:** Often the group mean score for the CCTST 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 when compared to the norm 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 20 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.
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, 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).

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.
Section 5:
Validity & Reliability

Content, Construct and Criterion Validity

While some begin with a bias against closed-framed or multiple choice items as a method for capturing valid evidence of a competency like critical thinking, 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. The CCTST research program, which began in the 1970s, demonstrates through the usual psychometric item analysis methods and a set of protocol analyses developed by Drs. Peter and Noreen Facione that a selection of closed-framed items can discriminate strong thinkers from weak thinkers in samples of test-takers across the academic disciplines and professional fields. The lead researchers and test developers gratefully acknowledge the additional validation work of Dr. Joanne Carter Wells of California State University Fullerton and Dr. Carol Gittens of Santa Clara University who were collaborators in this work for forms of the reasoning skills and attribute tests. And they wish to also thank the many profession-specific expert consultants from the private business sector, the military, health care, education and the legal profession for their assistance.

The information in this section of the test manual applies to all the reasoning skills instruments offered by Insight Assessment, which currently includes the CCTST, CCTST-G835, BCTST, HSRT, TER, BRT, CCTST M-Series and the part 2 tests in the MDCTI, LSRP, and INSIGHT series. And it applies as well as the related attribute measures focusing on reasoning dispositions and habits of mind, namely the CCTDI, CM3, and the part 1 tests in the MDCTI, LSRP, 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 reference only the CCTST in the paragraphs below.

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 2 and 8. 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 an 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 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.

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8 Nunnally, Jum C., Psychometric Theory, McGraw-Hill 1978
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.

**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.$^{16}$

NOTE: Theoretically, grade point average (GPA) should be correlated with a score of critical thinking ability. Most findings report this relationship to be of little or no significance ($r = .20$, $p<.001$), possibly a function of little variance in GPA in many samples or the reality that the proportion of explained variance in thinking ability is small as captured by the holistic measure GPA. Age is not a significant predictor of critical thinking ability when educational level is controlled; this is a consistent finding in samples of adequate size.

Evidence for the construct validity of the CCTST is provided by the demonstration of improvement in students’ CCTST test scores after they have taken 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.$^{10,11,12,13}$

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. In peer-reviewed independent research, the California family of critical thinking skills tests has been reported to capture gains in critical thinking skills after only a few weeks of critical thinking skills training. Citations of these studies can be

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found later in this section. 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-specific curriculum in the professional discipline. Additional independent research studies are listed below.

Validation studies have also been conducted to demonstrate that there is no evidence of threats to validity due to prior experience with the test instrument (test effects). In talk aloud studies, when the same version of the CCTST is used at posttest two weeks after pretest, test-takers are observed to recall some of the item stems but must reason through the answer choices again to determine their response to each item.

Gains in CCTST test scores should be expected when the critical thinking training intervention is well designed and well executed and when test-takers are adequately motivated to engage the test at posttest. Feedback from test administrators in both educational and workplace settings indicate that test-takers find the CCTST a difficult but engaging test.

**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 instance, 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, some of which are referenced here. Many additional reports are presented in the form of dissertations studies, web-published self-study reports, and industry-specific professional documents. The California Critical Thinking family of tests has been used in many independent research studies that have demonstrated these measures' validity to measure higher-order thinking ability and predict success in educational programs and workplace positions. The CCTST is cited in a large and growing literature, reflecting findings in both the United States and other nations around the world. Included in this research are doctoral dissertation studies examining critical thinking in relationship to disciplinary training in a wide variety of disciplines. A selection of these studies is cited below.

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14 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.


16 No significant differences in posttest scores are found between students who take the CCTST both at pretest and at posttest and students who take the CCTST as a posttest only.


Reliability

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) and are observed to maintain this performance in all samples of adequate variance. A discussion of instrument validation process and related internal consistency reliability coefficient is provided in the test manual for each instrument. Occasionally a customer may require a calculation of the reliability coefficient for their own sample. If you require this additional analysis, you can request and receive reliability coefficients for your sample if it is of adequate size to support this analysis. Additional fees apply.

Validation studies are ongoing for the development of all forms of the CCTST family of skills tests and the related attribute measures to ensure that item topics remain of current interest and cultural relevance for the intended test-taker group.

The data from ongoing validation studies produces internal consistency estimates (Kuder Richardson - 20) ranging from .68-.80. The Kuder-Richardson -20 is the comparable statistic to Cronbach’s alpha used for dichotomously scored instruments and scales. For an instrument with multidimensional scales, a KR-20 above .70 indicates a high level of internal consistency.23

Current aggregated KR-20 estimates for some of the varying forms of the CCTST are:
- Versions of Forms A and B = .70 -.75 (These forms are no longer in general use)
- Other versions of the CCTST (CCTST College-level, CCTST M-Series, HSRT, BCTST) = .78 -.82
- CCT G835 = .82

These coefficients demonstrate more than sufficient evidence to inspire confidence in the internal consistency of these instruments to measure the overall construct: critical thinking.

The scales have fewer items than the instrument as a whole, and yet their internal consistency reliability remains strong. KR – 20’s for the scales consistently range from .52 to .77. Factor loadings for items in each sub scale range from .300 to .770.

Additional reliability studies of authorized translations of the CCTST have been conducted. These translations are released when the reliability coefficients are achieved in adequate samples of native language speakers tested with the translated CCTST.

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23 Although a reliability coefficient of .80 is suggested for internal consistency on instruments intended to target a single, homogeneous ability, lower coefficients are often seen in the case of dichotomously scored tests, particularly those that test a multifaceted concept like critical thinking. Reliability ratings of .65 to .75 have been suggested to be considered sufficient for placing confidence in instruments of this type (Nunnally, 1978).
Published Research

A Selection of Independent Research

As indicated at the beginning of this section of the manual, there are many forms and versions of the CCTST family of assessment tools e.g. HSRT, BCTST, MDCTI, LSRP, INSIGHT series. Reports by independent investigators of their use of many these more recent versions of the CCTST also appear in the literature. Here are a few such references.


**Early Validation Studies**


Choose the Right Test

Versions of the CCTST family of instruments: When thinking about measuring critical thinking skills or habits of mind, the first decision is whether you want to test for strength in thinking skills or measure the habits of mind and dispositions associated with great critical thinkers. 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 are advised to consider the INSIGHT series.

In addition to the part 1 of each of the INSIGHT series tools, the CCTDI and the CM3, Insight Assessment also provides other instruments that measure critical thinking skills and habits of mind and a variety of workplace attribute measures. Contact Insight Assessment (www.insightassessment.com) for additional test manuals if your planned testing includes these areas.

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 CCTST 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 insightassessment.com for the most current list.
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

- **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.

- **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 all or a specified proportion of trainees or students have at least a particular level of critical thinking skills, and there is no concern to provide individual feedback or training to any given individual, testing at the end of a training program is an appropriate 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 CCTST Overall Scores are helpful to consider in determining a threshold score for your program admission purposes.

Selecting an Administration Method: All of the instruments offered by Insight Assessment are offered 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.
Section 6:

Online Test Administration

Getting Started with Online Testing

All of the California Critical Thinking Tests are available for online administration at your facility using the Insight Assessment online testing system. Once you have become a client and have had an orientation to the testing system, you will be able to log into the system as a test administrator to assign and schedule the CCTST or any other tests or surveys made available to you by Insight Assessment, and to manage and download your test data. Each of your test-takers 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. A full array of critical thinking testing instruments can be added to your online testing account as described below:

Previewing the Online Testing System: If you are not already familiar with the testing instrument or the online testing system, obtaining a preview pack will help you see how the test can best be used at your institution. This user guide and technical manual accompanies a preview of the online testing system to provide in-depth information as needed. The preview is designed to help you to receive optimal value from your test adoption and to view the test and the test experience from the perspective of your test-taker. Each preview includes one or more opportunities to enter the testing system as a test-taker, see the personal profile page, download and view an example test or tests relevant to your planned testing project, and see how your test-takers will respond to items, upload their test responses and (optionally) immediately view a printable report of their test scores.

Full Service Online Testing Options: Businesses and personal advising and counseling customers often require continuous testing capability with real-time results delivery. Fitting the test to the individual test-taker provides the best measure of critical thinking ability. For some, this means having a variety of test 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 a customized testing support service to fit your testing plan.

Hands-On Test Administration: Many customers prefer a hands-on experience as a test administrator. You or a designated person at your institution or business can be provided with an online testing account that allows you to control all needed aspects of your online testing. Customers who test often, use a variety of tests, or test a variety of different groups, often enjoy the ability to control the timing of test assignments and select varying options for each different test-taker group each time they begin a new testing session. Hands-on options include use of data analysis tools within the
system and data download capability.

**Personalized Telephone Orientation:** To get you started with hands-on test administration, adoption of online testing includes a telephone orientation to your online testing account. During that telephone orientation, our online testing professionals will assist you in creating 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 testing system capabilities.

**Login as a Test Administrator:** Access your personal testing administration online interface as a Client Administrator using the login button located on the Insight Assessment home page. [www.insightassessment.com](http://www.insightassessment.com)

When you meet with our online testing staff, you will be guided through your selection of the available testing options and the creation of your first test assignment. You’ll find that the system is easy to manage and offers you the opportunity to set the online testing system to match the situation at your institution or business.

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

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

- assign tests to be taken during specific time periods
- check on whether your test-takers have completed their test assignments
- decide whether your test-takers will see their test results (or not, at your option)
- ask additional demographic questions of your test-taker
- add more test-takers to a given test assignment or group
- instantly analyze the scores generated by your test-takers
- sort data by demographic variable, assignment or test group
- download test scores to use in your reports or additional analyses offline
- compare scores within subjects or across groups

If you prefer to have an account with no need for you to personally make test assignments or request data downloads, talk to our technical staff about customized service.
CHECKLIST for the Online Test Administrator

Step 1) Set up the Test Assignment: First make the test assignment (select the test to be administered and the time frame during which it will be available for your test-takers). If you have forgotten how to do this well, work with our staff to correctly set up your test assignment or, if you prefer, follow the guidelines in the help files you have been provided when you received your online orientation to the testing system.

Step 2) Assign the (Test-Taker Level) Login(s) and Password(s) to allow your test-takers to access the testing session. There are two main options to consider in this process. Option One: If you are testing a small number of individuals (hiring candidates, employees, course participants, select trainees) you may prefer to assign each expected test-taker a unique Login and Password. Option Two: As an alternative, it may be more convenient for your test-takers to enter the testing system using one Login and Password combination (a universal Login and Password portal) and then be assigned a unique Login and Password by the testing system when they complete and save 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 3) Give Test-Takers their Assignment Information and Login and Password Information. Inform your test-takers when and where they may take the test(s) online. Do NOT permit test-takers to examine, study, copy, review, or otherwise have access to the test other than during the testing session.

There is no need to instruct test-takers in the use of the testing system. The testing process is self-explanatory. However, if you would like to distribute instructions with the test assignment, the following page is a printable instruction sheet for online test-takers.

Remember: Check Computers for Readiness

Check each test 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.

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.
Test-Taker Instructions for Online Testing - CCTST

This testing period is timed for 45 minutes. Please be sure that you have allowed yourself plenty of time and that you are taking the test in an environment where you can work without interruption, and if using a laptop, that you have plenty of battery life to complete the test.

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.

![Test Taker Login Button]

3. When the dark blue Login screen appears enter the Login and Password you have been given for your test assignment:
   
   **Example:** Login: XYZuniv2013 Password: Graduate12

   Note: If you have any problems with the login, you can check the configuration of your computer by using the “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 test itself only after your profile is saved.

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

8. Accept the User Agreement Terms

9. Read the test instructions and continue to take the exam

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 the test you may Log Out, or take another test if one has been assigned, or update your personal profile, or, if the test administrator has authorized it, view and print your test results.
Proctor Instructions: Online Testing

Beginning Your Test Session

1. Direct test-takers to login from the Insight Assessment home page using the Login and Password which you provide for them.

   ![Test Taker Login](image)

   Note: If test-takers are going to be tested more than one time, e.g. for a pretest to posttest comparison, advise them to change the random computer generated Login and Password to something they will remember. The opportunity occurs when they are completing the test-taker personal profile. After their initial testing session, if they use their personal Login and Password, their individual profile loads automatically.

2. Direct test-takers to complete and then “SAVE” their personal profile. They will be able to download their assigned test only after their personal profile is completed. The test-taker profile includes some demographic questions. Once the test-taker has saved their profile, they will be able to download their assigned test(s).

3. Inform test-takers
   - questions can be answered in any order and answers can be changed at any time prior to submitting their responses to the test
   - the time remaining in the testing session will be displayed on the top right of their computer screen
   - use scroll bars if necessary to view the questions, answer choices, and navigation buttons
   - whether your test-takers will be receiving their individual test results

   Three possible options regarding what to tell test-takers about their test results:
   a) If you know that they will be receiving immediate results on screen, “Upon completion and submission of your test, a page will appear on your computer describing your results.” or
   b) If you know that they will receive results at some future time, “You will receive your results at a later date,” or
   c) If you are unsure or if you know that they will not be receiving their individual results, “After you have submitted your test the system will process your responses. You may then logoff.”

4. Signal test-takers when they may begin.

During the testing period:

The Insight Assessment Test-taker Interface is completely self-directed, but to further assist your test-takers in completing their profile, additional information to help them complete their individual profile and to orient them to the online testing system is available as a download from the Insight Assessment website. If you prefer, you may read or distribute Test-Taker Instructions for Online Testing on the previous page.

It is important that test proctors do not respond to questions seeking to clarify any of the test items. Proctors should not predispose test-taker performance by commenting on the test or any test item.
Section 7:

Paper-and-Pencil Test Administration

Getting Started with Paper-and-Pencil Testing

**CapScore™ General Information:** 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 testing materials from Insight Assessment. Rush delivery services are available if required to meet your planned testing date.

**Testing Materials Needed:** Each time you administer a test in paper-and-pencil format, your test-taker should be given a new test booklet and a CapScore™ response form. Quality control audits have shown that when tests are administered in paper-and-pencil format, test-takers are accustomed to marking test 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 other test-takers, new test booklets are always supplied with each test purchase.

CapScore™ response forms are date stamped to indicate their use period. Service agreements for scoring expire 24 months after purchase. Rush shipment of new test booklets and CapScore™ response forms is available.

There are many forms of the CCTST. CapScore™ response forms are coded with test 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 test forms at your institution, **assure that the code numbers on the test booklets match the code numbers on the CapScore™ response forms.** Mixing test materials from multiple test purchases is permissible, so long as the code numbers match and the testing materials remain valid.

**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 test-taking 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 test.

**Group Indicator Field:** On each CapScore™ response form there is a three-character field that can be used to identify test-takers subgroups (a training program session, class number, or any other 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 institution.

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 test 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.
Test-taker Instructions - CCTST

CapScore™ Paper-and-Pencil Testing

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 bubble. Also indicate your gender, class level, and how you identify yourself within the provided areas.

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 test.

7) Please be courteous to other test-takers and avoid causing any distractions. Please turn off all electronic devices.

8) This is a multiple-choice test. 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. You will receive no credit for missing or incorrect answers.

9) Your testing session is timed. You will have 45 minutes to complete the test.

10) The test proctor will collect your testing materials.
Proctor Instructions for CapScore™ Pencil-and-Paper Test Administration

Testing environments should allow for focused concentration on the test and be well lit and comfortable. Test-takers should approach the test well rested rather than in a state of cognitive fatigue. All electronic devices should be turned off during a testing session. Adequate time for test completion should be assured. Time on test 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 test booklet, a CapScore™ response form, and an Extra HB (USA # 2) pencil for each test-taker.
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 test name and code number on the cover of the test booklets matches the name and code number on the CapScore™ response forms. If you have been given test booklets with code numbers that do not match the code numbers on the CapScore™ response forms, notify your test administrator or contact Insight Assessment.
4. The testing session is timed, usually for 45 minutes. Some test-takers may finish early, but many will need this entire period of time to complete the test.
5. Additional information for your test-taker 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 test proctors do not respond to questions seeking to clarify any of the test items. Proctors should not predispose test-taker performance by commenting on the test or any test item. 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. Deter cheating and ensure that the environment remains free from distraction by remaining in the room and being visibly vigilant. As test booklets and CapScore™ response forms are returned, check that test-taker ID numbers have been properly entered. When the time period for testing expires, collect all copies of test booklets and all CapScore™ response forms and verify the count.

After the Testing Period is Completed:

Store all copies of the test booklets and CapScore™ response forms in a secure area. Do not permit test-takers access to the test booklet before or after the testing period. Destroy and recycle the used test booklets. Return CapScore™ response forms to the appropriate address for scoring as indicated on the website: www.insightassessment.com
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 Word® and Excel® format. Test 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.

IMPORTANT CONSIDERATION: CapScore™ response forms are specifically designed and encoded for each Insight Assessment test instrument. Only Insight Assessment printed and encoded CapScore™ response forms can be accurately scanned.

IMPORTANT CONSIDERATION: 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:

- Carefully examine the answer sheets to make sure test-takers have properly filled out the nine digit ID number section of the answer sheet. Make sure that the written ID numbers match the numbers marked in the bubbles below them.

- 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 test scores. You can download a copy of this form from the Insight Assessment website: www.insightassessment.com.

Mail your CapScore™ response forms to the address indicated on the website or at purchase. In most cases this address is: Insight Assessment, Attn: CapScore 1735 N 1st 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.

- The “group” indicator field on the CapScore™ response forms should be used to separate test-takers into groups for scoring. It is not necessary to attach paper clips, rubber bands, stickers, etc. to separate your test-taker groups, and doing so may damage the forms and prevent them from being accurately scored. If 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 forms of the CCTST may be scored using a spreadsheet method. This is particularly true during new instrument validation studies. If you have obtained this scoring contract at purchase, contact Insight Assessment for instructions when scoring of test data is required.
Section 8:

Topics of Interest

Terminology for Discussing Critical Thinking with Students and Trainees

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.

From: “CRITICAL THINKING: A STATEMENT OF EXPERT CONSENSUS FOR PURPOSES OF EDUCATIONAL ASSESSMENT AND INSTRUCTION”

APA DELPHI Research Report - TABLE 4

CONSENSUS DESCRIPTIONS OF CORE CRITICAL THINKING SKILLS AND SUB-SKILLS

INTERPRETATION: To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures or criteria. Interpretation includes categorization, decoding significance, and clarifying meaning.

1.1 CATEGORIZATION:
- to apprehend or appropriately formulate categories, distinctions, or frameworks for understanding, describing or characterizing information
- to describe experiences, situations, beliefs, events, etc. so that they take on comprehensible meanings in terms of appropriate categorizations, distinctions, or frameworks

For example: to recognize a problem and define its character without prejudice to inquiry; to determine a useful way of sorting and sub-classifying information; to make an understandable report of what one experienced in a given situation; to classify data, findings or opinions using a given classification schema

1.2 DECODING SIGNIFICANCE:
- to detect, attend to, and describe the informational content, affective purport, directive functions, intentions, motives, purposes, social significance, values, views, rules, procedures, criteria, or inferential relationships expressed in convention-based communication systems, such as in language, social behaviors, drawings, numbers, graphs, tables, charts, signs and symbols

For example: to detect and describe a person's purposes in asking a given question; to appreciate the significance of a particular facial expression or gesture used in a given social situation; to discern the use of irony or rhetorical questions in debate; to interpret the data displayed or presented using a particular form of instrumentation
1.3 CLARIFYING MEANING:
- to paraphrase or make explicit, through stipulation, description, analogy or figurative expression, the contextual, conventional or intended meanings of words, ideas, concepts, statements, behaviors, drawings, numbers, signs, charts, graphs, symbols, rules, events or ceremonies
- to use stipulation, description, analogy or figurative expression to remove confusing, unintended vagueness or ambiguity, or to design a reasonable procedure for so doing

For example: to restate what a person said using different words or expressions while preserving that person's intended meanings; to find an example which helps explain something to someone; to develop a distinction which makes clear a conceptual difference or removes a troublesome ambiguity

ANALYSIS: To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions or other forms of representation intended to express beliefs, judgments, experiences, reasons, information, or opinions. Analysis includes examining ideas, detecting arguments, and analyzing arguments.

2.1 EXAMINING IDEAS:
- to determine the role various expressions play or are intended to play in the context of argument, reasoning or persuasion
- to define terms
- to compare or contrast ideas, concepts, or statements
- to identify issues or problems and determine their component parts, and also to identify the conceptual relationships of those parts to each other and to the whole

For example: to identify a phrase intended to trigger a sympathetic emotional response which might induce an audience to agree with an opinion; to examine closely related proposals regarding a given problem and to determine their points of similarity and divergence; given a complicated assignment, to determine how it might be broken up into smaller, more manageable tasks; to define an abstract concept

2.2 DETECTING ARGUMENTS:
- given a set of statements, descriptions, questions or graphic representations, to determine whether or not the set expresses, or is intended to express, a reason or reasons in support of or contesting some claim, opinion or point of view

For example: given a paragraph, determine whether a standard reading of that paragraph in the context of how and where it is published, would suggest that it presents a claim as well as a reason or reasons in support of that claim; given a passage from a newspaper editorial, determine if the author of that passage intended it as an expression of reasons for or against a given claim or opinion; given a commercial announcement, identify any claims being advanced along with the reasons presented in their support

2.3 ANALYZING ARGUMENTS:
- given the expression of a reason or reasons intended to support or contest some claim, opinion or point of view, to identify and differentiate:
  - the intended main conclusion
  - the premises and reasons advanced in support of the main conclusion
  - further premises and reasons advanced as backup or support for those premises and reasons intended as supporting the main conclusion
  - additional unexpressed elements of that reasoning, such as intermediary conclusions, unstated assumptions or presuppositions
For example: given a brief argument, paragraph-sized argument, or a position paper on a controversial social issue, to identify the author's chief claim, the reasons and premises the author advances on behalf of that claim, the background information used to support those reasons or premises, and crucial assumptions implicit in the author's reasoning; given several reasons or chains of reasons in support of a particular claim, to develop a graphic representation which usefully characterizes the inferential flow of that reasoning.

EVALUATION: To assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation. Evaluation includes assessing claims and assessing arguments.

3.1 ASSESSING CLAIMS:
- to recognize the factors relevant to assessing the degree of credibility to ascribe to a source of information or opinion
- to assess the contextual relevance of questions, information, principles, rules or procedural directions
- to assess the acceptability, the level of confidence to place in the probability or truth of any given representation of an experience, situation, judgment, belief or opinion

For example: to recognize the factors which make a person a credible witness regarding a given event or credible authority on a given topic; to determine if a given principle of conduct is applicable to deciding what to do in a given situation; to determine if a given claim is likely to be true or false based on what one knows or can reasonably find out.

3.2 ASSESSING ARGUMENTS:
- to judge whether the assumed acceptability of the premises of a given argument justifies one's accepting as true (deductively certain), or very probably true (inductively justified), the expressed conclusion of that argument
- to anticipate or to raise questions or objections, and to assess whether these point to significant weakness in the argument being evaluated
- to determine whether an argument relies on false or doubtful assumptions or presuppositions and then to determine how crucially these affect its strength
- to judge between reasonable and fallacious inferences
- to judge the probative strength of an argument's premises and assumptions with a view toward determining the acceptability of the argument
- to determine and judge the probative strength of an argument's intended or unintended consequences with a view toward judging the acceptability of the argument
- to determine the extent to which possible additional information might strengthen or weaken an argument

For example: given an argument, to judge if its conclusion follows either with certainty or with a high level of confidence from its premises; to check for identifiable formal and informal fallacies; given an objection to an argument, to evaluate the logical force of that objection; to evaluate the quality and applicability of analogical arguments; to judge the logical strength of arguments based on hypothetical situations or causal reasoning; to judge if a given argument is relevant or applicable or has implications for the situation at hand; to determine how possible new data might lead logically to the further confirmation or disconfirmation of a given opinion.
INFERENCE: To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to educe the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation. Inference includes querying evidence, conjecturing alternatives, and drawing conclusions.

4.1 QUERYING EVIDENCE:
- in particular, to recognize premises which require support and to formulate a strategy for seeking and gathering information which might supply that support
- in general, to judge that information relevant to deciding the acceptability, plausibility or relative merits of a given alternative, question, issue, theory, hypothesis, or statement is required, and to determine plausible investigatory strategies for acquiring that information

For example: when attempting to develop a persuasive argument in support of one's opinion, to judge what background information it would be useful to have and to develop a plan which will yield a clear answer as to whether or not such information is available; after judging that certain missing information would be germane in determining if a given opinion is more or less reasonable than a competing opinion, to plan a search which will reveal if that information is available

4.2 CONJECTURING ALTERNATIVES:
- to formulate multiple alternatives for resolving a problem
- to postulate a series of suppositions regarding a question, to project alternative hypotheses regarding an event, to develop a variety of different plans to achieve some goal
- to draw out presuppositions and project the range of possible consequences of decisions, positions, policies, theories, or beliefs

For example: given a problem with technical, ethical or budgetary ramifications, to develop a set of options for addressing and resolving that problem; given a set of priorities with which one may or may not agree, to project the difficulties and the benefits which are likely to result if those priorities are adopted in decision making

4.3 DRAWING CONCLUSIONS:
- to apply appropriate modes of inference in determining what position, opinion or point of view one should take on a given matter or issue
- given a set of statements, descriptions, questions or other forms of representation, to educe, with the proper level of logical strength, their inferential relationships and the consequences or the presuppositions which they support, warrant, imply or entail
- to employ successfully various sub-species of reasoning, as for example to reason analogically, arithmetically, dialectically, scientifically, etc.
- to determine which of several possible conclusions is most strongly warranted or supported by the evidence at hand, or which should be rejected or regarded as less plausible by the information given

For example: to carry out experiments and to apply appropriate statistical inference techniques in order to confirm or disconfirm an empirical hypothesis; given a controversial issue to examine informed opinions, to consider various opposing views and the reasons advanced for them, gather relevant information, and formulate one's own considered opinion regarding that issue; to deduce a theorem from axioms using prescribed rules of inference
EXPLANATION: To state the results of one’s reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological and contextual considerations upon which one’s results were based; and to present one’s reasoning in the form of cogent arguments. Explanation includes stating results, justifying procedures, and presenting arguments.

5.1 STATING RESULTS:
- to produce accurate statements, descriptions or representations of the results of one's reasoning activities so as to analyze, evaluate, infer from, or monitor those results

For example: to state one's reasons for holding a given view; to write down for one's own future use one's current thinking about an important or complex matter; to state one's research findings; to convey one's analysis and judgment regarding a work of art; to state one's considered opinion on a matter of practical urgency

5.2 JUSTIFYING PROCEDURES:
- to present the evidential, conceptual, methodological, criteriological and contextual considerations which one used in forming one's interpretations, analyses, evaluation or inferences, so that one might accurately record, evaluate, describe or justify those processes to one's self or to others, or to remedy perceived deficiencies in the general way one executes those processes

For example: to keep a log of the steps followed in working through a long or difficult problem or scientific procedure; to explain one's choice of a particular statistical test for purposes of data analysis; to state the standards one used in evaluating a piece of literature; to explain how one understands a key concept when conceptual clarity is crucial for further progress on a given problem; to show that the prerequisites for the use of a given technical methodology have been satisfied; to report the strategy used in attempting to make a decision in a reasonable way; to design a graphic display which represents the quantitative or spatial information used as evidence

5.3 PRESENTING ARGUMENTS:
- to give reasons for accepting some claim
- to meet objections to the method, conceptualizations, evidence, criteria or contextual appropriateness of inferential, analytical or evaluative judgments

For example: to write a paper in which one argues for a given position or policy; to anticipate and to respond to reasonable criticisms one might expect to be raised against one's political views; to identify and express evidence and counter-evidence intended as a dialectical contribution to one's own or another person's thinking on a matter of deep personal concern

SELF-REGULATION: Self-consciously to monitor one's cognitive activities, the elements used in those activities, and the results educed, particularly by applying skills in analysis and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating, or correcting either one's reasoning or one's results. Self-regulation includes self-examination and self-correction.

6.1 SELF-EXAMINATION:
- to reflect on one's own reasoning and verify both the results produced and the correct application and execution of the cognitive skills involved
- to make an objective and thoughtful meta-cognitive self-assessment of one's opinions and reasons for holding them
● to judge the extent to which one's thinking is influenced by deficiencies in one's knowledge, or by stereotypes, prejudices, emotions or any other factors which constrain one's objectivity or rationality
● to reflect on one's motivations, values, attitudes and interests with a view toward determining that one has endeavored to be unbiased, fair-minded, thorough, objective, respectful of the truth, reasonable, and rational in coming to one's analyses, interpretations, evaluations, inferences, or expressions

For example: to examine one's views on a controversial issue with sensitivity to the possible influences of one's personal bias or self-interest; to review one's methodology or calculations with a view to detecting mistaken applications or inadvertent errors; to reread sources to assure that one has not overlooked important information; to identify and review the acceptability of the facts, opinions or assumptions one relied on in coming to a given point of view; to identify and review one's reasons and reasoning processes in coming to a given conclusion

6.2 SELF-CORRECTION:
● where self-examination reveals errors or deficiencies, to design reasonable procedures to remedy or correct, if possible, those mistakes and their causes

For example: given a methodological mistake or factual deficiency in one's work, to revise that work so as to correct the problem and then to determine if the revisions warrant changes in any position, findings, or opinions based thereon
Critical Thinking Skills and Habits of Mind
The Importance of Being both 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 dispositional profile of the ideal critical thinker is described by the Delphi experts as follows:

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.

The APA Delphi Study 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.”
Just as skills tests measure core cognitive skills (abilities), disposition tests measure attributes. These are also sometimes called character traits or dispositions, 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

**From the APA Delphi Report**

- 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 revise views where honest reflection suggests that change is warranted
Motivating Test-Takers

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

Many test-takers provide a stronger effort on the test when the result is of interest to them or carries some significance to them. Informing test-takers of the possibility of obtaining their test result may be an important consideration for your testing plan. Job applicants are rarely informed of their test 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 CCTST are proven indicators of success in workplace transition and professional certification and licensure. Depending on the design and the objectives of your testing program, it may be useful to provide test-takers with reports of their personal performance.

The decision of whether to provide test results to the test-taker is made by the test administrator. In the case of online testing this option can be selected with each new test assignment. In the case of paper-and-pencil testing, providing results to individual test-takers must be managed by the test administrator, once CapScore™ test results have been returned to the test administrator by Insight Assessment.

Measuring Gains in Critical Thinking Skills

Percentile Comparison Method: There are a number of ways to document quality improvement in critical thinking skills for your institution or organization. One method is to demonstrate an increasingly favorable comparison when the average group percentile score for your test-taker group is compared to an appropriate national norm group. Example: Improving your group’s overall percentile score from 52nd to 58th percentile demonstrates a significant overall gain in critical thinking scores.

Pretest – Posttest Method: Another method is to demonstrate improvement in a group of test-takers at your organization over time. This method rests on the measurement of the critical thinking skills of each of your test-taker groups at two time points, and examining the difference scores for gains (the difference between their pretest score and their posttest score). The CCTST Overall Score is the score that is best used to calculate difference scores (difference score = CCTST Overall Score at posttest minus the CCTST Overall Score at pretest).
Using Difference Scores to Assess Gains in Critical Thinking Skills

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 program.

If the educational program is effectively building critical thinking skills, some test-takers will exhibit difference scores of between 2 and 6 or more points in as short a time as a single course or semester. An overall gain for the group of 2 or more points is a strong effect.

Scores 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. Other data (less than 20 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.

![Difference scores from Pretest to Posttest](image)

**Figure 6: Difference Scores Comparing Pretest with Posttest Scores**
Effective Techniques for Building Critical Thinking Skills and Habits of Mind

Dr. Carol Gittens has prepared a list of suggestions that are useful techniques an instructor can use to promote strong critical thinking. These appear in the teaching manual accompanying her book THINK Critically by Pearson Education. This is an excerpt from those materials.

To engage students and trainees in successful critical thinking skills development, there are a few basics to keep in mind.

1) Use silence to allow everyone time to think through the question before the conversation begins. Pose thoughtful or insightful questions and intentionally allow 10–15 seconds of silence to elapse before calling on students to respond. Cognitive science research has shown that a pause of this length is necessary for the human brain to sufficiently process a question and formulate a reasonable response. Even 15 seconds of silence can seem a long time in a class session, but setting this expectation assures that one eager student will not end the thinking process for the entire group before all have had some time to practice their critical thinking skills.

2) Work from example to theory. Discuss the examples in the text first, and then draw out the concepts they teach. This technique practices students’ inductive reasoning skills and promotes active engagement and inquisitiveness.

3) Make the language of thinking a familiar vocabulary. Use critical thinking vocabulary when posing questions to students to reinforce conceptual understanding and promote recognition of reasoning. Use the names of the skills and the habits of mind that are found in the textbook. For example, use phrases such as: “What is your reason for that claim?” “Let’s interpret this statement.” “What inferences can we reasonably draw from these facts?” and “Let’s be systematic in our analysis.”

4) Engage students in dynamic learning activities that promote independent thinking or exposure to the thinking of others. Suggested activities include maintaining a reflective journal; conversing with a partner, small groups, or the whole class; investigations, inquiries, and informed conversations; debates; simulations; role playing; fishbowl activities; panel discussions; brainstorming exercises; case studies; course blogs or wikis; individual or group argument mapping; social networking features such as asynchronous bulletin boards that are often found in course management systems; maintaining a paper or electronic Portfolio, and so on.

5) Require students to provide reasons or explanations for all of their claims, interpretations, analyses, evaluations, and decisions. Ask why and expect a good, well-reasoned answer. Don’t let students get by with shut-down clichés such as, “That’s just how I feel,” “I was brought up to think that...,” “My parents always said that...,” and “It’s common sense.”

6) Model strong critical thinking for your students. Your students watch you to see if you believe in the value of critical thinking, so what you say and what you do might be more powerful in motivating them to build their critical thinking skills than anything they read or hear in a lecture. If you show that you practice the positive critical thinking habits of mind and that you engage in problems and decisions by applying critical thinking skills, that message comes through to them. If you do not, you reflect a negative message.
Critical Thinking Classroom Support Materials

All Insight Assessment customers who purchase testing receive free a package of instructional support materials which they may then duplicate and use with their students. Some tools explain what critical thinking is, some are teaching aids, some are personal or group process assessment tools. The packet includes the previously published essay Critical Thinking: What It Is and Why It Counts updated regularly by its author, Peter Facione, author of the text book, THINK Critically, by Pearson Education.

Test adoption includes a complimentary digital packet of teaching and learning support materials intended to assist both test-takers and trainers/faculty to build critical thinking skills through practice. The packet includes at least the following materials:

The Holistic Critical Thinking Scoring Rubric (HCTSR) is a rating measure that can be used to assess the quality of critical thinking displayed in a verbal presentation or written text. One would use the HCTSR to rate a written document or presentation in which the presenter is required to be explicit about their thinking process. It can be used in any educational program or assessment process. Its greatest value is obtained when used by learners to assess the quality of their own or another’s reasoning. The clearly described criteria assist the learner to internalize the characteristics of strong and weak critical thinking. If you plan to use this instrument to assess critical thinking for any high-stakes purposes, you must remember that your ratings will only be as valid at the strength of your raters. You will need to train the raters well to assure that they are making accurate ratings (judgments) about the evidence of critical thinking that they are observing and evaluating. It would be important to select a task, presentation, or written product where the thinker has been asked to explain their thinking and not just to provide the conclusions they have reached in regard to a particular dilemma. The validity and reliability of all such rubrics (rating forms) is judged by the Kappa Statistic. Rating tools are generally considered weaker measures of critical thinking than the other validated standardized instruments.

Critical Thinking: What it is and Why It Counts is an essay written by Dr. Peter Facione, a leading authority in critical thinking. This essay is periodically updated to capture new findings and discussion points to help learners explore the domain of critical thinking in all aspects of life and work. The original appeared in 1992. Author and the publisher hold copyright, ISBN 13: 978-1-891557-07-1. Permission is granted for paper, electronic, or digital copies to be made in unlimited numbers for purposes of advancing education and improving critical thinking, provided that distribution of copies is free of charge and provided that material is properly cited when extracted in whole or in part. For permission to reprint or permissions for intended resale, contact James Morante at 650-697-5628 or jmorante@insightassessment.com.

The Power of Asking Good Questions is a teaching tool designed to assist instructors in engaging students’ critical thinking. By asking questions like those listed in this table, instructors can raise the quality of classroom discussions from simple information sharing and opinion giving to the level of analysis, interpretation, inference, explanation, evaluation and self-reflection. This tool appears on page 8 of Critical Thinking: What It Is and Why It Counts and in THINK Critically, Facione and Gittens, Pearson Education.
Focused Training Strategies to Improve Critical Thinking is a thinking exercise designed to assist instructors to strengthen the teaching and learning strategies that they use to improve critical thinking skills and habits of mind. This thoughtful self-evaluation tool is also a powerful self-help guide to assist professional development for those focused on training critical thinking. The instructor who repeats this thinking exercise periodically will gain insights into their own best teaching practices and continuously improve their effectiveness in training strength in critical thinking.

Critical Thinking Training Session Feedback is a tool intended to function as both a self-evaluation tool for the learner and as an evaluation of the educational offering itself for its ability to engage the learner as intended. The exercise of completing the form asks the learner to reflect specifically on their thinking experience related to the learning opportunity. Responses for each of the individual items are informative, and as a collection they serve as a subjective report of the learner’s experience. This is not a direct measure of the objective quality of the learning experience, but a useful measure of the learning effect. This tool is NOT intended as a measure of strength or weakness in the learner's actual critical thinking ability, as self-assessments of thinking ability have been shown to be falsely positive.

Strong Critical Thinking in Groups is designed to support and augment the benefits of strong critical thinking educational offerings which contain group projects, discussions or presentations. This one-page tool guides learners through an evaluative thinking exercise in which they must rate the quality of the critical thinking demonstrated by the group effort. When used by a person who is observing a group process, this tool maximizes active learning by requiring the rater to explain the basis for his or her ratings of the group’s work at the framing of their problem, their analysis of the problem, and their formulation of solutions. When used after a group thinking exercise by participants in the group, the tool assists in reflection about the quality of the learning experience just completed.

Critical Thinking Reflective Log is intended to give structure and focus to journaling assignments made by many teachers and professors to assist students to integrate their learning experiences. As written, it is aimed at the undergraduate-level learner or novice professional, but it is easily adapted for use in other populations. Use the Reflective Log to coach and guide meta-cognition, and to develop students’ self-monitoring and self-correction skills.

Evaluating the Credibility of Sources explains the considerations which are relevant to the evaluation of expertise. It is a teaching tool which enables instructors to guide students’ critical thinking about what to believe or not to believe when they encounter claims on the Internet, TV, social media, or in the forms of advertising, rumors, hearsay, assertions by persons in power, celebrities, friends, etc. These pages are extracted from THINK Critically, Facione & Gittens, Pearson Education and offered here with the authors’ permission not only as a teaching tool, but as an example of the quality and practical utility of that book.

The Rubric for Evaluating Written Argumentation (REWA) is designed to provide detailed feedback on how written material that is intended to argue persuasively on behalf of a given claim, opinion, or recommendation might be improved. This rubric addresses eight different aspects of sound and effective writing: Purpose and Focus, Depth of Thought, Thesis, Reasoning, Organization, Voice, Grammar and Vocabulary, and Mechanics of Presentation.
Notable Quotes about Thinking Courageously and Well

“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 9:

Data Security, Privacy, Purchase Agreements, Copyright Notices, and Other Notices

Data Security

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