CAE

Corporate Capabilities

CAE provides an array of services to assist assessment organizations, state agencies, publishers, higher-education and K-12 institutions, and credentialing agencies. We are adept at working directly with test and content providers as well as in situations involving several service providers. Our engagements have been as varied as helping with a single program component such as scoring or standard setting to full-scale program implementation.

Communication
Communication with the client is central to effective project management and ultimately to the success of CAE projects. The project director and other members of the project team maintain frequent contact, both scheduled and unscheduled, to keep clients up-to-date and to ensure proper coordination of activities. The project director provides regular updates to inform clients of project progress and to identify any unexpected problems or delays. Frequent communication through phone calls, email, and face to face meetings, as needed, are an integral part of the CAE management approach. We believe that communication and relationship building is at the core of an effective project.

Understanding the Common Core
CAE is one of the few organizations experienced in developing assessment items for both the Partnership for Assessment of Readiness for College and Careers (PARCC) and Smarter Balanced state consortia. The item development process for these consortia, although based upon the same set of standards, has yielded very different end products. Each consortium has a unique approach to the development of its assessments, yet CAE has been able to successfully create innovative items for both groups. This experience puts CAE in the distinctive position of being able to develop a wide range of items that will meet the requirements of any assessment.

Evidence Centered Design – Our Approach to Item Development
CAE employs an evidence-based design approach (Almond, Steinberg, & Mislevy, 2002) to item development. First and foremost, test items are written to closely align with identified standards or other specifications of the cognitive (or affective/behavioral) goals. Consistent with a model of evidence-centered design, CAE considers student work on assessment tasks to be evidence of the assessment claims made. All assessment explicitly (or in some cases implicitly) asserts claims regarding the knowledge or skills measured by the assessment.

As a first step in item development, CAE identifies the claims made (at the total domain and individual standard/skill level). The identified claims then serve as a tool for ensuring and evaluating that assessment tasks produce evidence consistent with the claims made. While the concepts and process behind evidence-based design are certainly more complex than presented briefly here, our key point is that CAE embraces and employs evidence-centered design in its test development practices.

Types of Organizations Served
We offer services to government, for-profit, and not-for-profit organizations including:

- educational publishers
- educational technology providers
- educational service providers
- e-learning companies
- assessment organizations
- state agencies
- school districts
- credentialing bodies
- foundations

Project Management

CAE employs a project-based model of organization, staffing each team with individuals having the expertise required for the project tasks. Strong, centralized project management ensures the effective coordination within CAE and between CAE and its clients.

Each project begins life with the creation of a Project Plan. The Project Plan includes a description of the tasks to be completed, the timeline for their completion, and identification of specific team members with responsibility for completing each task. This clear articulation of responsibility ensures program goals are met, that all components of a complex project are coordinated with each other and other projects, and that nothing "falls between the cracks."

Project-Based Organization

Project teams may be constituted either solely from internal staff or may include both CAE and external consultants and usually comprise from three to five individuals but have been as large as 20. Teams are focused on achieving clearly stated project outcomes that are defined by a core set of project tasks and specific subtasks. This process serves as an overall guide to the project and forms the basis of long- and short-term planning such as monthly and weekly objectives. Weekly project team meetings are held to review active and upcoming objectives and to evaluate the performance and effectiveness of recently completed objectives, providing a basis for evaluating project needs and whether "course" corrections are required.

Each team is led by a project director who holds ultimate responsibility for achieving project success. The director's key responsibilities include overall technical advice and direction, upper-level management, quality control review of procedures and products, and communication with the client and advisory groups. Working closely with the project directors, the project manager directly supervises the project team. The project manager lists the objectives (tasks) for completion of a project, standards to be met, time schedules and skills required to accomplish each objective, and other resources required. Project managers maintain overall control of project components. Professional or technical personnel are assigned responsibility for specific objectives. Ongoing and central supervision, however, remains in the hands of the project directors and manager. This structure enables CAE to ensure timely, accurate, and cost-effective delivery of products and services to our customers.

CAE senior management maintains direct involvement in project activities. One or more CAE senior managers work closely with the project director to ensure that project activities are on course and that clients are satisfied.

Project Orientation/Training
All participants are oriented to the project requirements, program goals and purpose, and unique characteristics. Training is provided in the item development process and requirements. Item assignments are made.

- Organize materials. All materials collected as part of the framework development process are organized for use as part of item writing. The standards, objectives, or skills to which the items will be written are prepared. Additional materials are sought as necessary.
- Communication with clients. The item development team communicates with relevant client curriculum specialists or other parties to develop a more complete understanding of the field.
- Analyze materials. The materials obtained are reviewed and analyzed in preparation for item writing.
- Draft items. A first draft of the items is produced by assigned writers. Initial drafting may occur in team sessions to ensure calibration and synergy. All items are input directly into CAE's item-banking system and coded with regard to meta-data such as alignment and level as well as stage of development.
- Editorial review. An initial review by the test-development editor is conducted to determine if the item should be accepted, rejected, or sent back for revision. The editor makes the first round of edits.
- Draft art work. Art specifications for those items that have received preliminary acceptance are produced and forwarded to the art department for development.
- CAE content expert review. To ensure accuracy, each item is then reviewed by an additional content expert.
- CAE equity review. A CAE equity reviewer will review each item prior to release to ensure representativeness and freedom from bias. Recommendations for change or deletion will be addressed in the final editorial review.
- Final editorial review. Upon completion of the internal content-expert and equity reviews, the test editor will make final edits to the item as necessary.
- Proofing and copyediting. The test items are proofread and copyedited for grammar, punctuation, style, and accuracy.
- Permissions. The items requiring copyright approval or other permissions for use are identified and sent to the permissions coordinator to obtain permission.
- CAE revisions. CAE revises the items as per the decisions of the client.
- Items are prepared for committee/client review. The completed items are prepared for review by client committees or the client alone, depending upon the model employed.

Assessment Capabilities
CAE has provided assessment services ranging from initial design to final review meeting facilitation to test delivery and scoring. CAE staff members have actively engaged in designing, developing, and

implementing assessment programs for nearly a decade and have played a key role in numerous local, national, and international assessment efforts. Our services include:

- program design
- test specifications and blueprinting
- job analysis
- passage development
- item development
- technology-enhanced item development
- selected response, constructed response, and performance task development
- test production
- psychometric analysis
- validation and evaluation research
- standard setting
- review meeting facilitation
- test delivery and processing
- results reporting
- quality control/quality assurance
- test delivery system design and implementation

Guidelines for Assessment Development

Throughout the development phase, certain important considerations provide an important context and guide for the developer. All participants in the process are trained with regard to these issues and maintain a written version of these guidelines in front of them for use in this process. In each of the review categories, the guidelines provide examples of acceptable as well as unacceptable items. These key issues are described briefly below:

- Standards Alignment. All items for content fields must be aligned to the appropriate Standards.
- Accuracy. All items must be accurate in every respect. This includes content accuracy, proper terminology and mechanics.
- Importance. All items should reflect important content and skills, i.e., content and skills that are considered highly significant and that are commonly taught.
- Evidence-Based. All items should include a clear tie to expected evidence of success as determined based on the standard.
- Clarity. All items should be presented in a straightforward manner. Readability should be managed to ensure that it does not interfere with the examinees' ability to respond.
- Equity. All items should be free of potential ethnic, racial, geographic, or linguistic bias or bias with respect to disability.

Test and Item Development

We provide a full array of test- and item-development services including test design, item development, production, copyediting, review, field testing and quality assurance. We have helped design, develop and administer hundreds of assessments. CAE has worked with many higher education and K-12 organizations to design and implement large-scale assessment programs. At the heart of this process is

test and item development. Producing high-quality tests cost effectively is a major concern in any assessment effort. We have designed, managed, and developed thousands of test questions for many assessment organizations and governmental agencies. Test development services include:

- test design
- test specifications/objectives development
- test item development, review, and editing
- performance task/constructed response task development
- rubric development
- task model construction
- blue print development
- content and bias review of test items
- item field testing
- item analysis and calibration
- standard setting
- item and test validation
- scaling
- Computer Adaptive Testing (CAT)

Item development is a multi-step process. The description below highlights key steps in that process. Not all of the steps are required for every project, but these steps are presented as an illustration of the typical types of activities performed. It is important to note that this is a dynamic, iterative process that involves continuous refinement.

Constructed Response and Hand Scoring

Assessment programs that have elected to include open-ended constructed response or other innovative item types need a vendor with experience with these items. While these questions offer greater authenticity and an opportunity to assess in-depth candidate knowledge, they can be time-consuming and costly to score reliably. CAE can assist with the design and implementation of both your expert and automated essay scoring needs for essay and short answer exam components.

CAE provides professional constructed response scoring services to support client use of open ended assessment and survey questions. CAE provides both single read and double read services depending on the project requirements. All readings are closely monitored using both inline scorer comparison data and read behind methodologies. Our constructed response scoring services includes the full range of rubric development and training services.

CAE personnel have been actively engaged in constructed response scoring systems since the 1980's and have conducted scoring sessions ranging in size from 2 to 200 scorers.

Item Development Staff

Item Development personnel are content experts and/or editors with professional backgrounds in a variety of disciplines, including education, research, educational publishing and have extensive experience in test development procedures. Item development at CAE is a team effort that involves the

combined efforts of test item writers, test editors, psychometricians, content reviewers, and equity reviewers. The item development staff employs content-area expertise, classroom teaching experience, assessment knowledge, and test development background to create high-quality assessment systems designed to meet the needs and high standards of our customers.

Editing and Art Services

Supporting all of CAE's item development efforts is a group of experienced copy editors, proofreaders, artists, and graphic designers who apply their expertise to each project, moving through the production process from initial development to camera-ready copy. A continuous cycle of review, editing, and quality assurance assures that each published product meets the highest standards of accuracy in terms of language, content, and other specifications.

The Production group offers a range of services including copy editing and content editing to ensure that all client materials are both grammatically sound and accurate. Both print and electronic documents are carefully proofread and edited for style and accuracy. All materials are edited directly online in a single integrated production system to minimize risk of error and are conducted according to the highest standards of publishing.

Graphic artists produce all the artwork contained in CAE client tests according to specific requirements. This artwork is entered directly into the online production system.

CAE understands that item quality is a central issue. We do not lose sight of the fact that the tests we develop will be used to make important decisions.

Production and Printing Services

The Production group at CAE is also responsible for the physical production of all print and digital products for both program support and published product. CAE maintains an array of in-house printing options including both ink-jet and high-speed laser printers. Both black and white and color printing options are available. CAE also maintains relationships with several secure printers for larger volume print jobs.

Other Services:

Psychometric and Statistical Services

CAE offers a full array of psychometric and statistical services. We work closely with our clients to determine the appropriate research design and corresponding analysis plan to ensure that each project meets its specifically delineated goals. And while we have a broad range of psychometric and statistical capabilities, we maintain a philosophy that focuses our efforts on providing only those tools that best fit the client's needs.

CAE is well versed in psychometric methods and procedures. We provide an array of test-development and test-scoring services using both classical and IRT methods. We provide a full range of univariate and multivariate statistical research analyses using a combination of proprietary and "off the shelf" software. Commonly used software packages include R, SPSS, Bilog, Parscale, Winsteps, and Excel.

Standard Setting

Determining an appropriate minimum passing score is a critical phase in any test development process. There is a wide range of choices for conducting a standard setting study and we can assist you in identifying an appropriate standard setting process for your program. We can conduct standard setting studies and assist you in engaging important constituencies and decision makers in the process.

Preparation and Practice Assessment

Preparing for high-stakes examinations can present a significant challenge to examinees and affected institutions. Adequate preparation is essential for providing a fair and level "playing field." CAE can assist you in preparing candidates with the development and delivery of practice testing and other instructional materials.

Project Reporting

CAE provides a final report for each project. The reports range from a short technical analysis evaluating the psychometric properties of the developed items to a comprehensive final project summary. CAE also has experience with individual and institutional level score reporting as well as review of research studies and evaluation projects.

Training

Training and professional development are essential components of any successful large-scale assessment initiative. We can train your staff or your clients in several areas including:

- constructed response/open ended response scoring
- use of software based/online tests
- item development
- test development
- classical and IRT psychometric analyses
- interpreting and using score reports
- linking assessment and instruction
- standard setting

CAE Virtual Project Team

CAE maintains a large network of partner organizations, consultants, subject matter experts, and technical advisors to support specific needs for projects. This extended project team greatly expands CAE's resources and provides enhanced products and services for clients while minimizing project costs. CAE has used this general approach to achieve success on a variety of projects, ranging from research to curriculum and test development.

Multi-Vendor Participation

Many projects require the utilization and integration of multiple vendors, including item development and system development providers. CAE is comfortable participating in such efforts as the prime contractor or as a subcontractor to another organization. CAE staff has many years of experience

working with and managing teams consisting of multiple vendors. CAE's expertise can help clients remove the headache of handling an implementation involving multiple vendors.

Field Services
Successfully developing items demands a skilled field services operation. CAE offers several field services to support your research including cognitive lab and field testing. In addition, we can provide assistance in identifying sites for trialing of products as well as the management of field test activities. Moreover, we offer frequent, high quality field contact to ensure that the field testing is being conducted as expected (fidelity) and to ensure compliance and retention. We have developed and use several web tools to facilitate frequent high quality communication with personnel in the field.

Security
CAE offices are in a secure facility with restricted building access. Only authorized personnel are permitted in the building. All entrances are locked and monitored.

CAE's security policies cover all document handling procedures. Secure and confidential materials, including tests, test items, and examinee responses are kept under lock and key and are treated as secure; no tests or related materials can be taken out of the building without proper authorization.

All data processing equipment, communication and related services are protected. The CAE data network is firewall and virus protected, updated weekly (or more often if warranted by alerts). All sensitive materials are sent using secure socket layer (SSL) or through secure FTP (SFTP). All systems are password-protected and permissions are appropriate to the role and level of staff.