



FORM 257

PROFESSIONAL BOARD FOR PSYCHOLOGY

HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA

SOUTH AFRICAN GUIDELINES ON COMPUTERISED TESTING

TABLE OF CONTENTS

1.	CLARIFICATION OF TERMS.....	4
2.	REQUIREMENTS REGARDING COMPUTERISED AND INTERNET-DELIVERED TESTS FOR SOUTH AFRICA.....	4
2.1	CLASSIFICATION PROCESS AND RESEARCH EVIDENCE.....	4
2.2	SUPERVISION AND ADMINISTRATION.....	5
2.3	ETHICAL CONSIDERATIONS	5
2.4	AGE RESTRICTION FOR RESPONDENTS.....	5
2.5	ACCESS CONTROL.....	5
2.6	COMPUTER-GENERATED REPORTS	5
3.	GIVE DUE REGARD TO TECHNOLOGICAL ISSUES IN COMPUTER-BASED (CBT) AND INTERNET TESTING.....	6
3.1	GIVE CONSIDERATION TO HARDWARE AND SOFTWARE REQUIREMENTS	6
3.2	TAKE ACCOUNT OF THE ROBUSTNESS OF THE CBT/INTERNET TEST	7
3.3	CONSIDER HUMAN FACTORS ISSUES IN THE PRESENTATION OF MATERIAL VIA COMPUTER OR THE INTERNET	8
3.4	CONSIDER REASONABLE ADJUSTMENTS TO THE TECHNICAL FEATURES OF THE TEST FOR CANDIDATES WITH DISABILITIES	9
3.5	PROVIDE HELP, INFORMATION, AND PRACTICE ITEMS WITHIN THE CBT/INTERNET TEST	10
4.	ATTEND TO QUALITY ISSUES IN CBT AND INTERNET TESTING	11
4.1	ENSURE KNOWLEDGE, COMPETENCE AND APPROPRIATE USE OF CBT/INTERNET TESTING.....	11
4.2	CONSIDER THE PSYCHOMETRIC QUALITIES OF THE CBT/INTERNET TEST.....	12
4.3	WHERE THE CBT/INTERNET TEST HAS BEEN DEVELOPED FROM A PAPER AND PENCIL VERSION, ENSURE THAT THERE IS EVIDENCE OF EQUIVALENCE.....	13
4.4	SCORE AND ANALYSE CBT/INTERNET TESTING RESULTS ACCURATELY	14
4.5	INTERPRET RESULTS APPROPRIATELY AND PROVIDE APPROPRIATE FEEDBACK.....	15
4.6	CONSIDER EQUALITY OF ACCESS FOR ALL GROUPS.....	16
5.	PROVIDE APPROPRIATE LEVELS OF CONTROL OVER CBT AND INTERNET TESTING	17
5.1	DETAIL THE LEVEL OF CONTROL OVER THE TEST CONDITIONS.....	17
5.2	DETAIL THE APPROPRIATE CONTROL OVER THE SUPERVISION OF THE TESTING.....	18
5.3	GIVE DUE CONSIDERATION TO CONTROLLING PRIOR PRACTICE AND ITEM EXPOSURE	19
5.4	GIVE CONSIDERATION TO CONTROL OVER TEST-TAKER'S AUTHENTICITY AND CHEATING.....	19
6.	MAKE APPROPRIATE PROVISION FOR SECURITY AND SAFEGUARDING PRIVACY IN CBT AND INTERNET TESTING.....	20
6.1	TAKE ACCOUNT OF THE SECURITY OF TEST MATERIALS.....	20
6.2	CONSIDER THE SECURITY OF TEST-TAKER'S DATA TRANSFERRED OVER THE INTERNET	21
6.3	MAINTAIN THE CONFIDENTIALITY OF TEST-TAKER RESULTS.....	22

ACKNOWLEDGEMENT

These guidelines were based on the International Test Commission's Guidelines for Computer-based and Internet-delivered testing. This contribution is gratefully acknowledged.

PREAMBLE

In adapting the International policy to the South African situation, it has been necessary to make certain significant changes in order to avoid drawing up a policy that clashes with the existing legislative and regulatory framework within which testing operates in this country. The mandate of the Health Professions Council of South Africa is to guide the professions and to protect the public. In this regard it should not be forgotten that psychometric testing stands accused of having been used as an instrument of oppression in the past. Initially, early drafts of the Employment Equity Act banned the use of psychometric testing for the selection of candidates for work. Only after lobbying on the part of the profession of Psychology was testing allowed, provided that technical requirements for reliability, validity, fairness and lack of bias could be demonstrated. This controversy and the introduction of these standards indicate that the vulnerability of candidates who apply for position, particularly candidates who come from disadvantaged backgrounds, is recognized at legislative level. In protecting such persons, not only must the tests meet technical requirements, but the persons administering them must also conform to training and registration requirements.

The Health Professions Act clearly reserves the use of psychometric tests for the profession of psychology. The Professional Board for Psychology has drawn up a policy for the use and classification of psychometric instruments, which outlines the processes that must be followed when new instruments are created or introduced into this country from overseas. The Professional Board for Psychology has also resolved that all tests must be administered by persons registered with the Board. This ensures not only the levels of training, but also implies that persons administering psychometric tests are bound by an ethical code and professional regulations, in order to protect the public.

The requirement that all tests, including highly structured and computerized tests, must be administered by registered persons, is necessitated by a number of factors:

- The Ethical Code for Psychologists cautions against relying on a single measure for important decisions. As a result, batteries of tests are used, rather than single instruments. The person administering the battery must be trained to use the highest level test in the battery.
- It is recognized that the duty of being in charge of a testroom entails considerable responsibility, which goes beyond the mere ability to administer a given instrument. Not all respondents are equally able to deal with computerized testing, and the test administrator may sometimes have to recognize this, and recommend an alternative mode of administration, if this is available.
- Important, life-changing decisions are made in testrooms, and the person in charge needs to be able to deal with many eventualities in a professional way.
- With computerized testing and reporting systems, narrative reports are easily produced. This yields highly confidential information that needs to be dealt with professionally. Modern computerized systems are rarely used in such a way that the person administering the tests has no access to the results.
- Trained observation of the behaviour of persons undergoing tests is sometimes a valuable source of information for the person reporting on the results. This requires more skill than the mere administration of a structured test.

Thus, test administration requires not only the ability to administer specific instruments in a standardized and correct way, but also professional judgment, responsibility, contingency management skills and interpersonal skills to deal with people who are under stress.

1. CLARIFICATION OF TERMS

- **CBT** – Computer-based testing
- **CBTI** – Computer-based test interpretation
- **Computerised report** – A document produced automatically by a computer system to facilitate the interpretation and feedback of test results. These reports often involve scoring algorithms and norm tables. In some cases the norm tables are available for inspection, and in some cases the norm tables can be updated by the user.
- **Computerised test** – a test where the administration and scoring of the test is done on computer. The instructions are presented by computer and the responses are entered on computer. Also included are tests that may be answered on paper but the scoring is done by entering the responses into the computer.
- **Encryption** – The coding of confidential materials stored on a computer or transmitted over a network, for security and confidentiality purposes.
- **GUI** – Graphical User Interface. This refers to the way information is presented on computer and can include the positioning of text and graphics and the positioning and appearance of any response buttons or other control devices on the computer screen.
- **Internet-delivered test** – a Computerised test where the respondent needs to be connected to the Internet to complete the test. In some cases such tests involve the download of a program or 'applet' to handle the administration of the test onto the computer where the test is being completed. Test items are in some cases also downloaded. These downloads may or may not be encrypted, and they may or may not be deleted from the test administration computer after testing.
- **Test Taker** – The respondent or person taking the test.
- **Test user** – A person registered with the Health Professions Council of South Africa to administer the test in question.

2. REQUIREMENTS REGARDING COMPUTERISED AND INTERNET-DELIVERED TESTS FOR SOUTH AFRICA

2.1 CLASSIFICATION PROCESS AND RESEARCH EVIDENCE

Computerised and Internet-delivered tests should be classified and evaluated by the Psychometrics Committee of the Professional Board for Psychology before they can be sold or used to assess persons. Any person who renders an assessment service or who makes decisions on the results of psychological tests must ascertain that the test has been properly evaluated and classified.

As with pencil and paper tests, the Psychometrics Committee must be provided with all relevant documentation, user guides, research evidence and printouts of the instructions and item content, and examples of computer-generated reports if applicable, together with the required classification fee. The submitted documentation will be sent for independent review as with a pencil and paper test. The reviewers must be given access to the software to evaluate the computerized administration, and technical support must be provided to the reviewers by the test publisher where necessary, in order to enable this evaluation to take place.

For tests that are found to be psychological tests, a classification certificate will be issued specifying the categories of professionals who may administer the test and who may interpret and give feedback on the results.

2.2 SUPERVISION AND ADMINISTRATION

Computerised and Internet-delivered tests may not be administered unsupervised. Any test or questionnaire measuring a psychological construct, including computerized tests, must be administered by a person registered with the HPCSA. The test's classification certificate will specify the category of registration that is required to administer the test. Psychologists in charge of assessments for industry may not require prospective candidates to complete unsupervised psychological tests via the Internet.

2.3 ETHICAL CONSIDERATIONS

According to a ruling of the Executive Committee of the Professional Board for Psychology in August 2003, all internet-delivered psychological services must be subject to the Ethical Code for Psychologists at all times.

2.4 AGE RESTRICTION FOR RESPONDENTS

According to the ruling mentioned above, no Internet-Delivered psychological services may be rendered to clients under the age of 18 years.

2.5 ACCESS CONTROL

Computerised and Internet-delivered tests may not be marketed on the Internet without adequate verification that the prospective user is registered to use the test legally. Tests should be marketed only to persons who may use them unsupervised – that is, Psychologists and, for some tests, Psychometrists registered for independent practice. The purchaser's registration status must be verified, and a signature must be obtained.

2.6 COMPUTER-GENERATED REPORTS

Computer-generated reports should not be considered a substitute for professional judgment and responsibility. Where necessary, modifications must be made to the computer-generated text. Every report on a psychological test, whether computer-generated or not, must be signed by a professional who is qualified to report on the test. Signing such a report indicates that the person takes professional responsibility for the contents of the report as if he/she had written it.

UNMODIFIED AND UNSIGNED COMPUTER-GENERATED REPORTS SHOULD NOT BE DISSEMINATED TO UNQUALIFIED PERSONS, SUCH AS TEST-TAKERS, PARENTS, TEACHERS, LINE MANAGERS AND SO FORTH.

BEST PRACTICE GUIDELINES BASED ON THE INTERNATIONAL TEST COMMISSION'S GUIDELINES (with permission)

3. GIVE DUE REGARD TO TECHNOLOGICAL ISSUES IN COMPUTER-BASED (CBT) AND INTERNET TESTING

3.1 GIVE CONSIDERATION TO HARDWARE AND SOFTWARE REQUIREMENTS

- **Test Developers**

- Provide a clear description of the minimum hardware and software requirements of the CBT. For Internet testing specify browsers which will support the test.
- Conduct adequate usability testing of the system requirements using the appropriate delivery platforms to ensure consistency of appearance and delivery.
- Use appropriate technological features to enhance usability and follow established graphical user interface (GUI) design standards. For example, complex graphics and interactive features may reduce software running speed or download time. Items should be designed to fit the test purpose and objectives of assessment, and advanced multimedia features should be used only where justified by validity.
- Design the system to accommodate likely advances in technology.
- Design the Internet-delivered testing system to take account of the possibility of fluctuations in demand at different times.
- Ensure that applications of technology advances are tested, documented, and explained to users.
- Minimise the number of updates and version changes that are issued.
- Take account of the widely differing connection speeds that apply globally.

- **Test Publishers**

- Verify the documented minimum hardware, software or browser requirements to ensure that they are communicated clearly to the user. Ensure that other technical and operational requirements for the test are explained to the user.
- Confirm that adequate testing of the system has been completed and documented on the appropriate delivery platforms stated to be suitable.
- Use only software or hardware features that are essential for measuring the construct and that are likely to be available on systems used by the intended test users and test-takers.
- Ensure that the test will be as easy as possible to support and maintain in light of likely developments in hardware and software (operating systems etc).
- Test and document any new features added to the program after publication.

- **Test Users**

- Ensure that you have sufficient understanding of the technical and operational requirements of the test (i.e. hardware and software), as well as the necessary hardware, software and human resources to obtain, use, and maintain the CBT on an on-going basis.
- Confirm that the system the test-taker is using is documented as being suitable.
- Ensure there is a good justification for the use of complex software, graphics, and technical IT features in the CBT/Internet test.
- Monitor the supplier for information on future changes to the hardware requirements, test system, or software.

- v. Ensure understanding of the implications of changes and their impact on the testing process.

3.2 TAKE ACCOUNT OF THE ROBUSTNESS OF THE CBT/INTERNET TEST
--

- **Test Developers**

- i. Test the system to confirm that it is sufficiently robust and capable of dealing with likely system failures and user error.
- ii. Ensure that the CBT/Internet test is as 'fail-safe' as possible in order to minimise problems arising while the test-taker is responding. Where possible and appropriate:
 - a. treat upper and lower case fonts as equivalent,
 - b. prevent operation of keys or controls that have no function in the test,
 - c. eliminate auto-repeat functions of keys,
 - d. prevent a test-taker from exiting the test by accident,
 - e. provide timely and helpful error feedback,
 - f. follow GUI standards regarding features such as colour, layout, and design, and
 - g. if standardization is not important, allow the user multiple ways to navigate through the system, or allow the user to modify the interface to their liking.
- iii. When the CBT/Internet test is timed, design the system to respond promptly so that commands have an immediate effect on the screen (e.g., GUI design standards would indicate no more than a 2 second delay onscreen).
- iv. When the CBT/Internet test is timed, design features so that the time required to move between questions and for the system to record the answer is not part of the timed element (e.g., the test engine should deduct these times from the timing of the test or the timing clock should stop during access transitions).
- v. For Internet testing, minimise the impact of hang-ups, lost Internet connections and slow downloading (e.g., the system should ensure that no information is lost when the Internet connection is lost).
- vi. Provide documentation that specifies what to do in the event of routine problems with hardware and/or software.

- **Test Publishers**

- i. Confirm that the robustness of the system has been checked across a range of suitable platforms.
- ii. Provide sufficient redundancy on all systems throughout the Internet testing site (including incoming and outgoing communications) to allow the site to operate even if one of its components fails.
- iii. Check the degree to which the test prevents user errors from causing administration problems. Provide users with guidance on what to do in the event that 'bugs' occur during testing (e.g. a test user should be able to report bugs and problems that may be experienced during the testing process).
- iv. Provide users with contact details (e.g., telephone number, internet address) for technical support.
- v. Confirm that the CBT/Internet test responds in a timely manner when taking the test. Where this does not occur, inform test developers and discontinue use of the test until the problem is solved.

- vi. For Internet testing, put procedures in place to deal fairly with the impact of hang-ups, lost connections and slow downloads. Where download or other technical problems occur, advise the test user/taker of alternatives (e.g., using alternative media or an alternative venue).
- vii. Document and disseminate relevant technical support to test users. Where appropriate, offer technical support services with trained staff.

- **Test Users**

- i. Before beginning a test, verify that its robustness has been adequately tested (e.g. documentation provides supporting evidence).
- ii. Ensure processes are in place to log and resolve problems that may arise during testing.
- iii. Check availability of the information necessary for contacting the provider of technical support and use technical support services as necessary
- iv. Inform test publishers/developers where problems occur with the responsiveness of the computer to the test-taker input.
- v. For Internet testing, know the recommended procedures for dealing with hang-ups, lost connections and slow downloads, and advise test-takers accordingly.
- vi. Provide the test-taker with the technical support specified in the test documentation if any routine problems occur.

3.3	CONSIDER HUMAN FACTORS ISSUES IN THE PRESENTATION OF MATERIAL VIA COMPUTER OR THE INTERNET
------------	---

- **Test Developers**

- i. Design systems to follow GUI design standards that have been established by groups such as Human Factors International, including but not limited to:
 - a. ensuring screens have adequate resolution and colour,
 - b. using consistent screen locations and colour for instructional text and prompts,
 - c. using consistent screen design, layout and colours,
 - d. differentiating between test items and test instructions,
 - e. displaying only relevant information on-screen and ensuring the screen is not overfilled,
 - f. placing critical information at the start of the text,
 - g. providing instruction screens with clear fonts and avoiding distracting logos/images,
 - h. allowing test-takers to review or return to the instruction screen(s) where appropriate, and
 - i. ensuring representation of status change of display entities (e.g., dimming, highlighting) is consistent in appearance, and logical and meaningful.
- ii. Display test name, item number, and test prompts or directions at the same location on the screen for each test page.
- iii. Produce non-alarming, clear and concise error messages that inform how to proceed. Following an error alert, allow the test-taker to correct any errors and continue the test in the most efficient manner possible.

- **Test Publishers**
 - i. Verify that screen design issues have been taken into account in the development of the CBT/Internet test. Where problems are noticed, provide clear and detailed information about the problems to the test developer.
 - ii. Verify that item presentation is consistent throughout the test.
 - iii. Verify that appropriate and informative error messages are presented when necessary.
- **Test Users**
 - i. Be familiar with the screen design requirements of the test and ensure that such features are compatible with the systems being used.
 - ii. Ensure that test-takers are informed of screen design conventions, including where instructional text and prompts are placed, and how instructions can be accessed once testing begins.
 - iii. Be familiar with how items are presented and how the test-taker is required to respond.
 - iv. Verify that error messages are non-alarming and inform how to proceed.

3.4	CONSIDER REASONABLE ADJUSTMENTS TO THE TECHNICAL FEATURES OF THE TEST FOR CANDIDATES WITH DISABILITIES
------------	---

- **Test Developers**
 - i. Design CBT/Internet tests with hardware/software (e.g., response format) that facilitates the participation of test-takers with disabilities and special needs.
 - ii. Design CBT/Internet tests with hardware and software that can be modified to allow for appropriate test accommodations (e.g., increased font size).
- **Test Publishers**
 - i. Confirm that the hardware/software features of the CBT/Internet test facilitate the participation of test-takers with disabilities and those with special needs (e.g., those who need larger page font).
 - ii. Inform test users about the types of accommodations and modifications that can be made for test-takers with disabilities and those with special needs.
 - iii. Inform test users of the acceptable limits to which tests can be modified or accommodations provided to test-takers.
 - iv. Ensure that test modification and accommodations provided to test users are consistent with legislation regarding individuals with disabilities and special needs.
- **Test Users**
 - i. Check that the hardware/software features facilitate the participation of test-takers with disabilities and those with special needs.
 - ii. Follow best practice as in other modes of testing. Ensure that any necessary test modifications specifically address the test-taker's special needs and are within acceptable limits so as to not adversely affect score validity.
 - iii. Be aware of the impact these modifications may have on the test-taker's score.
 - iv. Consider the use of alternative assessment procedures, rather than modifications to CBT/Internet tests, (e.g., paper and pencil test or alternative structured forms of assessment).

3.5 PROVIDE HELP, INFORMATION, AND PRACTICE ITEMS WITHIN THE CBT/INTERNET TEST

- **Test Developers**
 - i. Provide clear, accurate, and appropriate technical support documentation in both electronic and paper formats. Ensure that such documentation is written at an appropriate level for its target audience.
 - ii. Provide clear instructions on how to load and set up the testing system. For Internet testing, information should be provided on how to log test-takers on and off the system.
 - iii. Provide sufficient and easily available on-screen instructions and help for test-takers. This should include, at a minimum, information about the test (number of items, timing, and types of items) and the testing procedure (how to navigate through the system and how to exit).
 - iv. Where appropriate, develop tutorials or practice tests/items that provide test-takers the opportunity to familiarise themselves with the CBT/Internet test.

- **Test Publishers**
 - i. Provide technical support documentation at a level appropriate for test users. Where appropriate, provide additional customer support services.
 - ii. Disseminate instructions on how to set-up the system to test users. For Internet testing, inform, where appropriate, test users on how to log a test-taker on and off the system.
 - iii. Provide clear and sufficient on-screen instructions.
 - iv. Where appropriate, verify that suitable practice items and tutorials are available. For Internet testing, provide procedures to verify whether a test-taker has accessed practice items and tutorials. Often a test cannot be started until certain practice items have been completed.

- **Test Users**
 - i. Understand the technical support documentation provided with the test and how to access additional technical support when needed.
 - ii. Know how to set up, load and log onto the system.
 - iii. Ensure the test-taker has access to information on the test and the testing process before beginning the test and is able to access on-screen help while completing the test.
 - iv. For Internet testing, provide clear information to the test-taker on how to log-in to and off from the system (e.g., the use of passwords).
 - v. Provide sufficient opportunity for the test-taker to become familiar with the testing software and the required hardware.
 - vi. Where appropriate, direct test-takers to appropriate Internet testing practice sites.
 - vii. Where appropriate, inform the test-taker about available practice tests. Make it clear that it is the test-taker's responsibility to practice any embedded tutorials and responses to test items (e.g., use of the input device).
 - viii. Where appropriate, collect data on test-taker reactions towards Internet-delivered testing and provide feedback to test developers to help them ensure a more positive experience for test-takers.

4. ATTEND TO QUALITY ISSUES IN CBT AND INTERNET TESTING

4.1 ENSURE KNOWLEDGE, COMPETENCE AND APPROPRIATE USE OF CBT/INTERNET TESTING

- **Test Developers**
 - i. Document the constructs that are intended to be measured and investigate whether CBT/Internet mode of delivery is appropriate in terms of content and technical adequacy to access the relevant constructs.
 - ii. Ensure all those involved in test design and development (item writers, psychometricians, software developers etc.) have sufficient knowledge and competence to develop CBT/Internet tests.
 - iii. Remain current on recent advances in CBT/Internet testing, including advances in computer hardware and software technologies and capabilities.
 - iv. Adhere to legal, professional, and ethical mandates and guidelines related to CBT/Internet testing.
 - v. It is important that during the development of items and tests, the content is protected, through the use of agreements as well as sound security procedures.
- **Test Publishers**
 - i. Ensure that the CBT/Internet test is suitable in terms of content and technical adequacy for its stated purpose and intended test-taker groups.
 - ii. Provide test users with sufficient information about the CBT/Internet test, its modes of operation, and basic computer functions. If appropriate, provide training materials that are specific to CBT/Internet tests and testing.
 - iii. Provide test users with 'best practice' testing policies.
 - iv. Provide test users with clear instructions on how to correctly access and administer Internet tests, including how to log test-takers onto the system.
 - v. Maintain and regularly update documentation relating to CBT/Internet testing, including pertinent changes in legislation and policy.
 - vi. Adhere to legal, professional, and ethical mandates related to CBT/Internet testing.
- **Test Users**
 - i. Assess the appropriateness of the content and technical adequacy of CBT/Internet testing relative to alternative testing methods for each client. Inform test-takers of the purpose of the testing and obtain informed consent.
 - ii. Have adequate knowledge of the CBT/Internet test and its modes of operation. When required, attend appropriate training events and read and have knowledge of relevant training materials.
 - iii. Follow best practices in the use of CBT/Internet testing and, where appropriate, create 'best practice' testing policies. Ensure that these policies are not in conflict with legislation and professional regulations.
 - iv. Verify that test-takers know how to interact with an Internet testing system (e.g., basic browser operation).
 - v. Maintain and regularly update knowledge about CBT/Internet testing, including pertinent changes in legislation and policy.
 - vi. Adhere to legal, professional, and ethical mandates related to CBT/Internet testing.

4.2 CONSIDER THE PSYCHOMETRIC QUALITIES OF THE CBT/INTERNET TEST

- **Test Developers**

- i. Document and disseminate information on the validity, reliability, and fairness of the CBT/Internet testing process.
- ii. Ensure that current psychometric standards (test reliability, validity, etc) apply even though the way in which the tests are developed and delivered may differ.
- iii. Take care that the CBT/Internet test does not require knowledge, skills, or abilities (e.g., computer skills) that are irrelevant to or might impede the test-taker's ability to perform the test.
- iv. Describe the theoretical and practical applications of algorithms used in test-item selection and/or controlling item or test order (as in adaptive testing).
- v. Where test-item content changes, retest and evaluate the changes.

- **Test Publishers**

- i. Provide appropriate documentation for the psychometric properties of the CBT/Internet test.
- ii. Ensure that current psychometric standards (test reliability, validity etc.) have been met even though the way in which the tests are developed and delivered may differ.
- iii. Publish and offer online only those tests that have appropriate psychometric evidence to support their use, and that have been evaluated and classified by the Professional Board for Psychology.
- iv. When offering assessments online, give advice to test users as to what to look for in order to help them distinguish between tests with and without documented psychometric properties.
- v. Verify that the CBT/Internet test does not require knowledge, skills or abilities that are irrelevant to the construct being assessed.
- vi. Provide documentation that describes the algorithms and measurement models used and present evidence showing that the test has been validated using these algorithms or models.
- vii. For tests based on models that may be unfamiliar to test users, provide explanations of the relevant concepts for the user.
- viii. Verify that psychometric model fit has been re-evaluated when changes are made to the test content.

- **Test Users**

- i. Ensure that documentation of the appropriate psychometric evidence is supplied with the CBT/Internet test.
- ii. Ensure that current psychometric standards (test reliability, validity etc.) have been met even though the way in which the tests are developed and delivered may differ.
- iii. Be able to distinguish between tests with and without documented psychometric properties. Use only tests with documented properties, and ensure that the evidence is appropriate for the intended use of the test.
- iv. For Internet testing, use only those websites supported by publishers who offer validated psychometric tests, that have been evaluated and classified by the Professional Board for Psychology.

- v. Check that the CBT/Internet test does not require knowledge, skills or abilities that are irrelevant to the construct being assessed.
- vi. Where appropriate, review and understand the documentation that describes how the CBT/Internet test uses algorithms for item generation, selection, or test construction, for controlling the order of testing, and the model underlying the development of the test.
- vii. When necessary, access appropriate training to ensure continuing professional development.
- viii. Document information provided about changes to test items or parameters and their impact on the test properties.

4.3	WHERE THE CBT/INTERNET TEST HAS BEEN DEVELOPED FROM A PAPER AND PENCIL VERSION, ENSURE THAT THERE IS EVIDENCE OF EQUIVALENCE
------------	---

- **Test Developers**

- i. Provide clear documented evidence of the equivalence between the CBT/Internet test and non-computer versions (if the CBT/Internet version is a parallel form). Specifically, to show that the two versions:
 - a. have comparable reliabilities,
 - b. correlate with each other at the expected level from the reliability estimates,
 - c. correlate comparably with other tests and external criteria, and
 - d. produce comparable means and standard deviations or have been appropriately calibrated to render comparable scores.
- ii. When designing a CBT/Internet version of a non-computerised test, ensure that:
 - a. there is equivalent test-taker control (such as the ability to skip or review items) as on the manual version,
 - b. the method of item presentation ensures that the results from the CBT/Internet test are equivalent to the manual version, and
 - c. the format for responding is equivalent.
- iii. For Internet-based tests, studies of test equivalence and norming should be conducted over the Internet with participants completing the test under conditions that represent those that the intended target population will experience.

- **Test Publishers**

- i. Evaluate the documented evidence of the equivalence of the CBT/Internet test, especially if norms from manual versions are to be used by test users to interpret scores on a computerised version of the test.
- ii. If the developer does not provide evidence of equivalence (e.g., comparable reliabilities, etc.), conduct appropriate equivalence studies.
- iii. If the developer does not provide evidence relating to the use of the test under conditions that represent those that the intended target population will experience, additional studies of test equivalence and norming should be conducted.
- iv. Verify that the technical features of the CBT/Internet test (e.g., test-taker control and item presentation) allow the results from the CBT/Internet test to be equivalent to the manual version.

- **Test Users**

- i. Confirm that the evidence regarding the equivalence of the CBT/Internet test to the manual version is sufficient.
- ii. If norms are based on manual versions of the test, confirm that evidence has been obtained to show equivalence of test means and SDs across versions and for appropriate subpopulations.
- iii. Verify that the technical features of the CBT/Internet test (e.g., test-taker control and item presentation) allow the results from the CBT/Internet test to be equivalent to the manual version.

Only use the test in those modes of administration for which it has been designed

4.4 SCORE AND ANALYSE CBT/INTERNET TESTING RESULTS ACCURATELY
--

- **Test Developers**

- i. Ensure the accuracy of rules/algorithms underlying the scoring of the CBT/Internet test.
- ii. Provide appropriate documentation of the use and validity of scoring rules.
- iii. Where reports classify test respondents into categories, such as 'Introverted type' or 'High sales potential', provide information in the test manual that specifies the accuracy of the classification system used to generate computer-based test interpretations (CBTI).
- iv. Describe the rationale for CBTI statements and how statements are derived from particular scores or score patterns.
- v. When test data are hand-entered into a computer, devise procedures to allow for data to be checked for accuracy.

- **Test Publishers**

- i. Confirm that the accuracy of scoring rules has been adequately evaluated prior to test use.
- ii. Inform test users about the scoring rules employed within the CBT/Internet test (e.g., use of non-scored items, penalties for guessing).
- iii. Inform test users how CBTI statements are derived and the validity of that methodology.
- iv. Stress to test users the importance of carefully checking data input by hand into a computer for scoring.

- **Test Users**

- i. Review and understand the rules underlying the scoring of the CBT/Internet test.
- ii. Inform test-takers, when appropriate, about how scores are generated.
- iii. Know how the statements in the CBTI are derived and be aware of the limitations such methods may have.
- iv. Ensure the accuracy of test data that are hand-entered into the computer.

4.5 INTERPRET RESULTS APPROPRIATELY AND PROVIDE APPROPRIATE FEEDBACK

- **Test Developers**

- i. Illustrate potential limitations of the computer-based test interpretations (CBTI) specific to the current CBT/Internet test.
- ii. Design and embed individual CBTI report templates for all stakeholders in the testing process.
- iii. Illustrate how to obtain these various reports and what is contained within each report. In particular consider the:
 - a. media (e.g., text, graphics, etc.),
 - b. complexity of the report,
 - c. report structure,
 - d. purposes of testing,
 - e. degree of modifiability,
 - f. style and tone of report, and
 - g. intended recipients.
- iv. Provide appropriate guidance on giving feedback, including necessary training requirements for interpreting the CBTI.

- **Test Publishers**

- i. Inform test users of the potential limitations of interpreting results using CBTI. Specifically:
 - a. statements in a report may be general and not directed towards the specific purpose of the assessment (or specific individuals);
 - b. interpretation is based only on scores of those tests whose data were used as input; therefore, other ancillary data which may be important cannot be taken into account (e.g., scores on other, non-computerised, forms of assessment);
- ii. Assess the suitability of the CBTI provided within the CBT/Internet test system. In particular, take note of:
 - a. evidence of the validity and utility of reports,
 - b. the coverage of the reports,
 - c. the consistency of the reports based on similar sets of data,
 - d. the acceptability of the report to intended audiences,
 - e. time, cost and length implications for a test user, and
 - f. freedom from systematic bias.
- iii. Advise test users on how best to share CBTI with test-takers and other relevant stakeholders.
- iv. Inform test users of ethical and other accepted practice issues related to providing CBTI feedback to test-takers.

- **Test Users**

- i. When interpreting the CBTI results, be aware of potential limitations, general and specific, to the reports being used. For example:
- ii. Tests alone, however administered, may not provide a complete assessment of an individual, as other confirmatory or ancillary information is not considered.
- iii. Select and use the most appropriate CBTI template for the client or intended audience.
- iv. Ensure that the language and information given in the CBTI fit the needs of the intended stakeholder (e.g., test-taker, organisation, and client).
- v. Confirm that there is a sound basis for the CBTI and that its rationale is well-documented.
- vi. Where possible, edit CBTI reports to include information obtained from other sources to ensure a comprehensive treatment of the test-taker's background, behaviour, ability, aptitude, and personality.
- vii. Ensure appropriate, relevant, and timely feedback is provided to the test-taker and other relevant stakeholders.
- viii. Ensure that computerised testing presents test interpretations in a comprehensible and meaningful form.
- ix. Provide client test interpretations that are appropriate for the context and intended use of the test (e.g., high or low stakes testing, corporate versus individual applications).
- x. Take account of ethical issues surrounding the provision of feedback using computer-based test interpretation. Where appropriate, feedback should include directions on how to access support and other information.

4.6 CONSIDER EQUALITY OF ACCESS FOR ALL GROUPS

- **Test Developers**

- i. Document the methods used to enhance psychometric fairness and equality of access.
- ii. Assess Differential Item Functioning (DIF) and, where DIF might be a problem for one or more groups, identify where this problem occurs and attempt to modify the test to overcome such problems.
- iii. When developing CBT/Internet tests that may be used internationally, take into account the fact that countries differ in their access to computer technology or the Internet.
- iv. For tests that are to be used internationally:
- v. avoid the use of language, drawings, content, graphics (etc.,) that are country or culture specific.
- vi. where culture specific tests may be more suitable than culturally-neutral ones, ensure that there is construct equivalence across the different forms.
- vii. If developing adapted versions of an Internet test for use in specific countries ensure the equivalence of the adapted version and that the adaptation conforms to the ITC Guidelines on Test Adaptation and/or other nationally accepted guidelines for test adaptation and validation.

- **Test Publishers**

- i. Where possible, encourage test users to collect biographical data on test-takers in order to monitor the number of people from protected/minority groups who take any CBT/Internet test.
- ii. Where unequal access to CBT/Internet tests may occur, recommend that test users make alternative forms of assessment available.
- iii. Inform test users of any evidence regarding DIF for different test-taker groups.
- iv. When tests are published internationally, provide test users with advice on how to ensure equivalent access to computer technology or the Internet for geographically-diverse groups of test-takers.
- v. Where an adapted version of a test is available, provide documentation specifying the equivalence of the adaptation to the original assessment.

- **Test Users**

- i. To monitor for possible adverse impact, collect data on the number of individuals accessing the CBT/Internet test from protected/minority groups.
- ii. For most countries such groups may be legally defined in terms of one or more of the following: ethnicity, gender, age, disability, religion, and sexual orientation.
- iii. Where there is evidence of possible inequality of access, offer the use of alternative methods of testing.
- iv. Where possible, collect data to monitor group differences in test scores.
- v. Consider the appropriateness and feasibility of Internet testing if testing in locations with limited access to computer technology or the Internet.
- vi. If testing internationally, use the country-specific adapted versions of the test, if available.

5. PROVIDE APPROPRIATE LEVELS OF CONTROL OVER CBT AND INTERNET TESTING

5.1 DETAIL THE LEVEL OF CONTROL OVER THE TEST CONDITIONS

- **Test Developers**

- i. Document the hardware, software, and procedural requirements for administration of a CBT/Internet test.
- ii. Provide a description of the test-taking conditions required for appropriate CBT/Internet test administration.
- iii. Design the CBT/Internet test to be compatible with country-specific health and safety, legal, and union regulations and rules (e.g., time on task).

- **Test Publishers**

- i. Provide sufficient details to test users on hardware, software, and procedural requirements for administering the CBT/Internet test.
- ii. Describe the test taking conditions candidates should consider when undertaking an Internet-based test.
- iii. Inform test users of the need to consider health and safety rules during CBT/Internet testing. For example, identify whether an Internet test has the facility for breaks if the testing process is lengthy.

- **Test Users**

- i. When administering the test, adhere to the standard hardware, software, and procedural requirements specified in the test manual. Before testing, ensure that software and hardware are working properly.
- ii. When testing at a specific test centre, ensure that the test-taker is comfortable with the workstation and work surface (e.g., the ergonomics are suitable). For example, test-takers should:
 - a. be encouraged to maintain proper seating posture,
 - b. be able to easily reach and manipulate all keys and controls,
 - c. have sufficient leg room, and
 - d. not be required to sit in one position for too long.
- iii. When testing via the Internet, provide instructions to test-takers that specify the best methods of taking the test.
- iv. Ensure that the facilities, conditions, and requirements of the testing conform to national health and safety, and union rules. For example, there may be rules governing the length of time a person should work at a monitor before having a break, or rules as to adequate lighting, heating, and ventilation. When testing over the Internet, inform test-takers of such rules and regulations.

5.2 DETAIL THE APPROPRIATE CONTROL OVER THE SUPERVISION OF THE TESTING

- **Test Developers**

- i. Document the level of supervision required for the CBT/Internet test.
 - a. Open mode – No direct human supervision required
 - b. Controlled mode – Although direct human supervision is not required, the test is made available only to known test-takers
 - c. Supervised mode – Test users are required to log on a candidate and confirm that the testing was administered and completed correctly
- ii. Managed mode – A high level of human supervision and control over test-taking conditions is required (as in a dedicated test centre)

NOTE that in South Africa only Supervised and Managed modes are allowed, and testing sessions need to be supervised by persons registered with the HPCSA to administer the tests being used.

- **Test Publishers**

- i. Document the level of supervision expected for the CBT/Internet test. Note that in South Africa only Supervised and Managed modes are allowed, and testing sessions need to be supervised by persons registered with the HPCSA to administer the tests being used.
- ii. Specify and restrict the use of specific CBT/Internet tests for particular testing scenarios.

- **Test Users**

- i. Identify the level of supervision required to administer the CBT/Internet test. Note that in South Africa only Supervised and Managed modes are allowed, and testing sessions need to be supervised by persons registered with the HPCSA to administer the tests being used.
- ii. Use the CBT/Internet test only in the appropriate testing scenarios for which it was designed, and in compliance with South African legislation and professional regulations.

5.3 GIVE DUE CONSIDERATION TO CONTROLLING PRIOR PRACTICE AND ITEM EXPOSURE

- **Test Developers**
 - i. For Internet-based tests, reduce item exposure and the risk of cheating by generating parallel forms from item banks.
 - ii. When parallel forms of a test are created, undertake appropriate psychometric analysis to document their equivalence.
 - iii. Limit pilot testing of items on live tests, to minimize unnecessary exposure.
 - iv. Make sure item banks are sufficiently large to permit making multiple secure parallel forms.
 - v. Contemplate non-linear delivery strategies (random-on-the-fly, adaptive, etc.) to deter memorization of test content.
 - vi. Control exposure of fixed forms in geographies where cheating is more prevalent.
- **Test Publishers**
 - i. Verify that Internet-based maximum performance tests (i.e., high-stakes) have appropriate controls to reduce item exposure.
 - ii. Provide test users with sufficient information on and training in how to reduce item exposure.
 - iii. Where appropriate, provide test-takers with practice without compromising the security of the test items.
- **Test Users**
 - i. Document for test-takers the equivalence of parallel forms of a test.
 - ii. Protect the CBT/Internet test from previous item exposure by not coaching test-takers with actual test content.
 - iii. Where appropriate, provide test-takers with practice without compromising the security of the test itself.

5.4 GIVE CONSIDERATION TO CONTROL OVER TEST-TAKER'S AUTHENTICITY AND CHEATING

- **Test Developers**
 - i. Design features within the system (e.g., the facility for passwords and username access) that enables test publishers/users to have a level of control over access to various parts of the assessment system.
- **Test Publishers**
 - i. Detail the level of authentication required to access various parts of the assessment system, based on the mode of operation used. Exercise control by requiring test users (in the Supervised and Managed modes) to use a username and password when accessing the test.
 - ii. For moderate or high stakes testing, provide information on how test users can reduce the risk of test-taker cheating (e.g., having another person to take the test as a proxy). Tests should always be administered by a person registered with the HPCSA.
 - iii. Identify the threats to test validity that exist if test control is not maintained properly.

- iv. Provide advice on the design and implementation of 'honesty (honour) policies' in assessment procedures

- **Test Users**

- i. Ensure test-takers provide the appropriate level of authentication before testing begins. Test-takers should be required to provide authentic, government approved picture identification.
- ii. For moderate or high stakes testing confirm that procedures are in place to reduce the opportunity for cheating. Technological features may be used where appropriate and feasible (e.g., Closed Circuit Television, CCTV), a follow-up supervised assessment, or a face-to-face feedback session (e.g., for post-sift assessment in job selection situations).
- iii. Provide test-takers with a list of expectations and consequences for fraudulent test taking practices, and require test-takers to sign the agreement form indicating their commitment.

6. MAKE APPROPRIATE PROVISION FOR SECURITY AND SAFEGUARDING PRIVACY IN CBT AND INTERNET TESTING
--

6.1 TAKE ACCOUNT OF THE SECURITY OF TEST MATERIALS

- **Test Developers**

- i. Design features into the CBT/Internet system that minimise the risk of test items, scoring keys, and interpretation algorithms being illegitimately printed, downloaded, copied, or sent electronically to another computer. For example, software can be developed that controls browser function by disabling access to menu selections (such as copy, paste).
- ii. Design features into the system (e.g., firewalls) that protects the CBT/Internet test system and associated databases from illegal hacking and computer viruses.

- **Test Publishers**

- i. Protect sensitive features of the test from illegitimate disclosure. For Internet testing, all important intellectual property (e.g., scoring rules, norms, interpretation algorithms) associated with a test should remain on the host server. Only test items and the outputs from report generators usually should appear on the test user's or test-taker's screens.
- ii. Where appropriate, develop a policy that limits test material access to qualified and authorised test users and testing centres. For example, when testing over the Internet, test users would need to obtain and use a password before they were able to access test materials or set up an assessment for a test-taker.
- iii. Passwords should be issued only to users qualified to use the Internet test.
- iv. Verify and check that the CBT/Internet test has features to protect it from illegal hacking and computer viruses. Confirm for Internet testing that reasonable steps have been taken to prevent servers from being accessed by unauthorised or illegal means.
- v. For Internet testing, maintain control over the sensitive features of the test and report copyright violations on the Internet. Monitor the web for illegal versions, old/outdated versions and part versions of the Internet test and take steps (e.g., enforcing copyright law) to eliminate these violations.
- vi. Take steps to secure protection of test content under existing laws.
- vii. Take appropriate measures to identify stolen test material on the Internet and to estimate the impact of its distribution on the testing program.
- viii. Take appropriate measures to control the distribution of stolen test material on the Internet including notification of appropriate legal authorities.

- ix. Maintain a process for the adjudication of security breach allegations and specify appropriate sanctions.

- **Test Users**

- i. Know the features that have been developed to ensure the security of test materials, and develop procedures that reduce unauthorised access to such materials.
- ii. Respect the sensitive nature of test materials and intellectual property rights of test publishers/developers.
- iii. Protect test materials from being copied, printed, or otherwise reproduced without the prior written permission of the holder of the copyright.
- iv. Protect passwords and usernames from becoming known to others who are not authorised or qualified to have them.
- v. Inform the service provider/publisher of any breach in security.

6.2 CONSIDER THE SECURITY OF TEST-TAKER'S DATA TRANSFERRED OVER THE INTERNET

- **Test Developers**

- i. When designing an Internet test, build in features that safeguard test-taker data and maintain the security of test material transferred over the Internet.
- ii. Make use of proxy servers, where appropriate, and embed transactions within secure socket layers.
- iii. Design data management systems to enable users to access, check, and/or delete data from the server in accordance with local data protection and privacy legislation.
- iv. Design features that ensure regular and frequent backups of all collected data and that allow for recovery of data when problems emerge.

- **Test Publishers**

- i. Maintain the security of test-taker data transmitted over the Internet (e.g. by encryption).
- ii. Ensure that test users and test-takers are informed that the host server has correctly received their data.
- iii. Inform test users of their rights and obligations in relation to local data protection and privacy legislation.
- iv. Conduct regular and frequent backups of all collected data and provide test users with a detailed disaster recovery plan should problems emerge.

- **Test Users**

- i. Prior to test administration, have knowledge of and inform test-takers of the security procedures used to safeguard data transmitted over the Internet.
- ii. Confirm with the service provider that they frequently back up data.
- iii. Verify that the service provider is able to allow test users and authorised others to discharge their responsibilities as data controllers under local data protection and privacy legislation (e.g. the European Union's Directive on Data Protection).

6.3 MAINTAIN THE CONFIDENTIALITY OF TEST-TAKER RESULTS

- **Test Developers**
 - i. Design features to allow secure storage of CBT/Internet test data on computer, disks or server.
 - ii. Maintain the integrity of CBT/Internet test data by providing technology that does not allow unauthorised altering of information and that can detect unauthorised changes to information.
 - iii. Devise encryption devices and password protection that restrict access to test data.
- **Test Publishers**
 - i. When test data must be stored with publishers, specify the procedures and systems to maintain the confidentiality and security of data.
 - ii. Inform test users of who has access to test data, for what purposes, and how long the data will be stored electronically.
 - iii. Adhere to country-specific data protection laws/regulations governing the storage of personal data.
 - iv. Restrict access to personal data stored on the host server to those who are qualified and authorised.
 - v. Protect all sensitive personal material held on computer, disk, or a server with robust (non-trivial) encryption devices or passwords.
 - vi. Confirm the security and confidentiality of the backup data when used to store sensitive personal data.
- **Test Users**
 - i. Know how confidentiality will be maintained when data are stored electronically.
 - ii. Adhere to country-specific data protection laws/regulations governing the collection, use, storage and security of personal data.
 - iii. Protect all material via the use of encryption or passwords when storing sensitive personal data electronically on test centre facilities.
 - iv. Apply the same levels of security and confidentiality to backup data as to the data on the live system when backups are used to store personal data.

---o0o---