From paper and pencil to computer-based testing

Why test?

High-stakes assessment – an examination for which the results have important and direct results for those who take it as well as for those who sponsor it – has been around for a long time. As many as 5000 years ago, examinations were used in the selection process for civil service positions in China. For a vast majority of this history, pencil-and-paper (P&P) administration was the only choice. Modern-day test sponsors have the option of computer-based testing (CBT) and with it, a host of benefits that cannot be realised through P&P testing. Because of its advantages, CBT has become the de facto standard for large-scale, high-stakes assessments. But the benefits of CBT shouldn't be taken for granted. The benefits achieved in transitioning to CBT depend upon the CBT provider selected as well as the needs of the test sponsor and the candidate population. Pearson VUE has assisted hundreds of test sponsors across the globe in successfully implementing CBT. Many of these organisations started with a P&P test that they needed to convert to CBT.
“Using these experiences, Pearson VUE is able to work with you to determine the specific CBT model most advantageous to the particular needs of your candidates and organisation.”
Why have so many organisations decided that CBT is right for them?

Not all test sponsors arrive at the decision to transition to CBT through the same route or for the same reasons. It’s important for you to understand the potential benefits of CBT so that you can implement a programme that takes full advantage of these benefits in line with your testing programme and priorities.

It’s also important to work with a provider that understands that ‘one size doesn’t fit all’ when it comes to CBT implementation.

**Security**
Test security matters. Protection of intellectual property – the test items and exams – is vital to your reputation. P&P testing involves the transportation of tests to those involved in their administration. Each paper copy of a test and each hand-off in the process carries with it a risk that the test may be exposed or leaked. The need to keep track of all printed copies of the test is a significant challenge in P&P testing. CBT eliminates the greatest risk of test exposure – multiple printed copies of the test.

At Pearson VUE, we use the latest encryption technology to deliver tests through our secure network. When the test is downloaded to the test centre, it is held in a secure state at all times prior to test delivery. When the candidate is ready to take the test, it is unlocked by the test invigilator. This happens in real-time and it is completely indiscernible to the candidate.

In addition candidates can be screened through a multi-layered process that goes beyond standard ID verification. Pearson VUE’s check-in procedures, for example, can include biometric technology to establish candidate identity. Candidate monitoring is achieved through invigilation and CCTV. Pearson VUE also has well-established reporting procedures if candidate misconduct is suspected.

**Benefits of CBT**

- Increased security
- Professional, standardised and consistent testing environment
- More frequent testing opportunities: window or on-demand
- Scheduling in real-time
- Immediate candidate results
- Advanced item types
- Measurement accuracy and efficiency
- Increased test centre coverage & accessibility
- Data rich results
- Brand extension & customisation
Professional test environments
Pearson VUE test centres are designed to be both secure and conducive to testing, not in lecture halls, conference centres and other spaces adapted to administer pencil-and-paper tests on an occasional basis. This means that the CBT environment is far less subject to variation in human process providing a more consistent candidate experience. This is magnified when using a Pearson VUE-owned and -operated network. Pearson VUE’s own test centres use a patented design which provides a neutral, distraction-free environment to enable the best candidate performance.

Flexibility: on-demand & test windows
CBT allows flexibility – for both the test sponsor and the candidates. On-demand testing means candidates can sit an exam throughout the year, selecting a date and location most convenient to them. On-demand testing is attractive to many test sponsors since it enables candidates to test when they are ready and able. However, we appreciate that on-demand testing may not work for all testing programmes. For some examinations, test windows may be preferred. Test windows allow test sponsors to make exams available for specific time periods during the year. Test windows can be selected to correspond to other milestones, such as the completion of a mandatory training programme.

Advanced item types
CBT opens up opportunities for new and innovative ways of assessing candidates' knowledge and skills, in some cases leading to more authentic assessment. CBT can provide a means of assessing test constructs that are difficult to assess in P&P testing.

Measurement efficiency
CBT facilitates the use of modern psychometric methods. Item response theory (IRT) has become the accepted standard for high-stakes assessment. IRT is a statistical model for analysing and scoring tests which provides greater measurement precision than other, older educational measurement methodologies. Using IRT means that exams can be better tailored to candidate proficiency – leading to measurement efficiency. IRT also permits the use of different test administration models – models that cannot be used in P&P testing. These models are discussed on the next page.

Access to data
CBT means that test sponsors have access to increased levels of data - data that is automatically captured about the candidate testing experience that just can't be captured in P&P testing. This information can be used to make informed decisions about your testing programme. For instance, timing analysis on how long it takes candidates to respond to questions or the test as a whole can provide information about whether the time allowed for an exam is appropriate or needs to be adjusted.
Brand extension and customisation

Pearson VUE’s highly configurable CBT system means that we can adhere to and enforce your brand guidelines. Furthermore, the transition to CBT from P&P testing may enhance your brand perception as a modern organisation functioning in an ever-increasingly technological world.

Transition planning

Our core business is computer-based testing and large-scale data management. We’ve helped hundreds of test sponsors from a range of market sectors make the leap from P&P to CBT.

We can help you avoid some of the common transition pitfalls. One of these pitfalls is trying to mimic the paper based experience, without allowing full consideration of how CBT can benefit your testing programme. On the other side of the coin is choosing too many features that will not contribute to better measurement, just because they are CBT supported.

We recognise that some organisations may find it necessary to support dual delivery modes for a period of time to provide reassurance during the transition or for political reasons. However, parallel CBT and P&P testing is another course of action that we generally recommend against. Managing CBT and P&P processes at the same time increases expense and complexities of the measurement models implemented without allowing you to take full advantage of the infrastructure savings associated with CBT.

Working collaboratively, Pearson VUE can also support you with applying the best practices we have gathered through our experience in assisting other clients. Successful implementation of CBT requires a thorough consideration of all components of your testing programme – from item and test development to results and reporting – to determine how they will be affected by the transition, as well as how the processes might be improved by CBT.

The key to this type of thoughtful evaluation is that it is built upon your own organisational priorities. Pearson VUE has developed transition planning methodologies that address all of the necessary elements for successful CBT implementation. Planning and effort early on in the process creates an excellent framework for what must subsequently be accomplished.

CBT test administration models

Linear, fixed-form:
This method most closely resembles P&P testing. A set number of alternative test forms (or papers) are prepared prior to test administration. When linear forms are administered via CBT, test-takers are typically presented only one item at a time, and the test items are frequently administered in randomised order – providing additional test security.

Linear-on-the-fly testing (LOFT):
A test administration method that selects items for administration to individual test takers based upon predetermined content and statistical constraints so that test takers receive comparable test forms. Through LOFT, a large number of possible test forms are created, thereby limiting item exposure and increasing test security.

Computer-adaptive testing (CAT):
A test administration model in which successive items are selected from a pool of items based upon the test taker’s performance on previous items – with a more difficult item being selected after a correct response, and an easier item being selected after an incorrect response. CAT provides higher-quality measurement and/or is more efficient than linear testing models because test takers are not administered items that are much too easy or much too difficult for them.

Pearson VUE can work with you to determine which CBT administration model is right for you.
Three primary elements to achieving a smooth transition:

1. A considered transition plan

A transition plan requires the combined effort of the test sponsor and the CBT provider. We will work with you to determine the final task list and timelines. We will also work with you to create a cross-organisational team (between you and Pearson VUE) to prepare for the hand-off of examination materials and other data transfer procedures.

Task areas addressed in the transition plan include the following:

- Stakeholder buy-in
- Finalisation of programme requirements
- Internal processes of the test sponsor to support CBT
- Candidate communications
- Test publishing procedures
- Technology development plans, if necessary
- Results reporting schedules
- Quality monitoring processes & evaluation criteria
2 Stakeholder buy-in

It is critical that all stakeholders – educators, employers, potential candidates, and those who already hold the certification – buy-in to the transition to CBT. Communication is key to gaining stakeholder buy-in. A consistent message, geared for each type of stakeholder, should be communicated through a variety of means. Test sponsors should not rely upon one single communication but rather should develop a plan for staged communications during the transition. Misinformation is one of the biggest stumbling blocks in the transition. Pearson VUE plays an active role in the meetings and presentations scheduled during this phase. We bring extensive direct and relevant experience to the table and are eager to assist in a successful partnership by getting stakeholder buy-in to your new programme.

3 Programme requirements

Determining all the specific programme requirements must be accomplished very early in the transition process. The task of programme requirement refinement is made more effective in two ways:

- The thoroughness of the requirements gathering process
- Our experience in developing computerised testing programmes around the world

A not so daunting process

If you decide to convert to CBT, we'll be with you every step of the way. Being the CBT business of Pearson, the world's leading education company, we're part of a large and respected family. We've helped businesses, professional organisations, and academic institutions move their testing programmes from P&P to CBT. Our guidance – and organisation and effort at project onset – provide an excellent framework for a successful transition.

CBT is a standard, global practice

CBT is delivered in approximately 180 countries by Pearson VUE. It's an established practice across the globe – as the preferred way to develop, deliver, manage and grow a testing programme. Done right, computer-based testing can revolutionise your testing programme – for both your organisation and your candidates.
When we ran our paper and pencil exam we were testing around 800 candidates a year. Due to significant growth, we soon found ourselves with a candidate population of over 2,000. Such an increase meant that delivery via paper and pencil was no longer viable. The move to CBT enabled us to run exams off-shore and benefit from more robust security measures. It proved an efficient process and caused no disruption to our operations or candidates.

Susan Buick, Programme Director, Examinations Development & Risk Management at the Australian Medical Council

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