

Online testing and online marking technology

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OVERVIEW

Online marking has been used internationally over the past few years to allow writing tasks to be marked by teachers from remote locations. Multiple choice questions and short answer questions have been marked by scanning the test booklets and using Optical Mark Recognition (OMR) and Intelligent Character Recognition (ICR) technologies to assess the answers.

The capability now exists to use Online Testing Software that allows students to use computers and participate in tests online. They can be provided with random questions from an item bank and have multiple choice and open short answer questions marked almost instantaneously.

This online solution is more efficient and more effective than the current process. It eliminates the costs and management effort associated with printing, distribution, collection, scanning, and data capture of tests. It also allows open ended scripts to be marked far more easily using electronic and manual marking methods. Just as importantly the online solution saves time in collating data and provides results to schools and students in vastly improved timeframes.

Simultaneous online testing for large numbers of students requires infrastructure and process changes to be made to the existing testing system prior to implementation of this solution.

Paper based Tests

Internationally, the majority of countries use paper based examinations to provide information on each student's progress in meeting the country's curriculum standard.

In Australia, the main standard testing program is the National Assessment Program - Literacy and Numeracy (NAPLAN). This is an annual assessment program where all students in years 3, 5, 7 and 9 complete a series of tests in

reading, writing, language conventions (spelling, punctuation and grammar) and numeracy (working effectively with numbers, space and measurement). All students in years 3, 5, 7 and 9 are expected to participate. The results of the tests provide information for students, parents, teachers and principals about student progress that can be used to support the ongoing development of teaching and learning programs.

The tests are used in Government, Catholic and Independent schools. It is expected that in 2010, approximately 1,040,000 students will be enrolled for participation in the NAPLAN testing program.

The NAPLAN requires high quality processes that are consistent with national requirements for assessment. The tests are held at the same time each year, (May 2010) in all states and territories. This requirement places maximum demands on available human resources. As a result, contractors are required to assist in meet increasingly demanding standards the quality, security of information and the need for common, national service level agreements.

The processes involved in NAPLAN include the following:

1. Item development for each test
2. Desktop processing of guides, forms and other support materials;
3. Secure pre-press production and offset printing of test booklets, stimulus and other test materials;
4. Web based test administration, including registration of students enrolled in tests;
5. Overprinting of test materials with student details;
6. Packing tests and other materials ready for distribution to schools;
7. Distribution of test packages to schools;
8. Tracking booklets down to the page level through all processes;
9. Building applications to capture specific data from tests;
10. Collection of test booklets from schools by secure courier;
11. Secure storage of completed booklets in pre-processing;
12. Scanning test booklets;
13. Data capture using OMR, ICR and OCR technologies;
14. Paper based or Online Marking to capture results of writing task/s;

15. Data consolidation and analysis to produce accurate, high-quality results data;
16. Offset printing and variable overprinting of individual student reports for parents;
17. Report packing;
18. Distribution of reporting packages to schools; and
19. Individual school enquiry follow-up.

As described above, there are many steps involved from the initial production of paper based tests to the final output of reports to parents and schools. The current timeframe for the process is October through to the following September. Students sit for the test in May and finally obtain results in August (a 3 month delay). The process is time consuming, carries considerable risk due to its many complexities and the number of steps involved. The entire project costs around AUD \$35 million each year.

Online Marking

Over the past few years, several suppliers have developed Online Marking solutions to replace the paper based marking of written examinations. Online Marking technology streamlines writing task marking, increases productivity and reduces costs.

Online marking solutions require time and resources to set up each test:

- Build the rubric grid for markers to refer to;
- Build the marking grid to align to the criteria being marked;
- Insert specific training, practice and control scripts into the system;
- Add security around marker access to the system;
- Input and output data file changes depending on criteria;
- Set up the marking centre – 200 workstations and infrastructure; and
- Set up, testing and dismantling time for infrastructure.

The existing paper based process and the Online Marking process both deliver the desired result. However, Online Marking provides the following additional benefits:

- The markers do not see any student demographic information;
- Writing tasks can be mixed for different year levels;
- Control scripts can be hidden from markers;
- Team leaders and senior markers have better insight to individual markers capability and accuracy;
- Double marking can be blind;
- The system provides more security over test papers;
- Improved reporting and statistical capability; and
- Elimination of “air swings” (markers missing out criteria on the marking forms).

Online Testing

So where do we go from here? The next step in the process is to start to convert the paper based testing system to an electronic based system. This effectively replaces the majority of the paper based steps I mentioned earlier. Of the 19 steps above, we can eliminate 13, leaving just steps 1, 2, 4, 9, 14 and 15. However, introducing an Online Testing system raises some other logistical issues, namely:

- Access to PC's or laptops for students to undertake the test simultaneously;
- Server infrastructure to support such a large number of students simultaneously;
- Internet access capability at each school site;
- Back up for the Online Testing solution; and

- Writing task – typing skills issue.

Online testing will probably need to be phased in over time to enable the infrastructure to be deployed at all testing points. I envisage a dual paper based/online testing environment for several years to manage the staged deployment of technology. Once the students do sit for the test online, the following benefits will materialise:

- Students can be given random multiple choice questions from an item bank, or questions can be randomised to reduce the chance of cheating;
- Students can be given immediate results for their multiple choice questions and short answer questions at the completion of the test or within a week if including national results (excluding writing).
- As written tests can then be marked by computer software and /or teacher markers, these could be available within a 1 to 4 week period.
- This would reduce the current 3 month period to one month.
- Paper based reports could be replaced by an electronic copy, providing greater detail for parents and students, thereby tightening this phase of the process.
- Parents and teachers can review the student's answers online, by comparing them to the test answers online.
- Students could use previous year's tests online to test their capability and get instantaneous results.
- Costs for this solution are dramatically lower than for the current process. AUD \$19 per student instead of AUD \$33.65 per student.

Summary

In summary, we have evolved our process from strictly paper based solutions to employing technology to improve the writing task marking. The next stage is to introduce online testing, which will expand the online environment to include multiple choice questions. This will improve accuracy, provide timely results and reduce costs. It will take time to implement these solutions due to the existing

infrastructure in place here in Australia and may take longer in some other countries. In the end, students, parents and teachers will use these technologies and benefit from added transparency, faster provision of results, more flexible working conditions and a more cost efficient process.