OKI®

Bubble Sheet Testing in Education's Future

School Docu Tool Industry White Paper

Executive Summary

For the moment at least, the debate over testing in education seems to be focused largely on bubble sheet/multiple choice testing. Even President Obama has weighed in, saying,

> *"Creativity has been drained from classrooms, as too many teachers are forced to teach to fill-in-the-bubble tests."*

Too often lost in the debate, however, is Obama's added contention that bubble sheet testing "should be one of the tools that we use to make sure our children are learning." Like President Obama, many educators understand the clear advantages of bubble sheet and multiple choice testing. In a time of ever-tightening budgets, these testing protocols provide an economical and fast way to gauge whether students are absorbing material. Further, modern bubble sheet testing solutions have evolved to become faster, easier, more efficient and less costly. As a result, districts that choose the right solution can help teachers spend more time teaching while also addressing document management and budget challenges.

For those who believe, as many do, that bubble sheet testing will continue to play a vital role in education, now is the time to consider the options. This is equally true for districts already using Scantron test scoring machines. This white paper explores solutions that can work side-by-side with or replace Scantron, while adding efficiency and savings to a district's overall testing procedures.

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Challenges in Education Assessment Practices

Testing students and analyzing results remain intricate and time-consuming processes. On average, teachers spend at least 35%[1] of their time on grading papers and on administrative tasks. And while many teachers still use outside services to grade tests, those services can take more time and effort than necessary. Unfortunately, when testing and grading processes consume too much time, teachers are denied the opportunity to quickly address student comprehension gaps.

Couple shrinking budgets with increasing pressure "from above" to meet state-mandated standards, and districts have a recipe for teacher frustration. The following statement from a teacher speaks volumes about the state of education assessment:

> *"... This year has been the most stressful year for me and for my team ... We're doing lesson plans—detailed lesson plans. We're making games, we're correcting all those papers ... and we're not only doing this during the day ... we have to take work home. People forget that we have families and we have a life of our own. So on weekends, we're doing work. I'm up sometimes til 2 a.m. trying to do stuff that will help these children learn. ... I am not against assessment ... I am against the pressure and the stress that is put on us ..."* [2]

While every type of testing carries challenges, schools have clearly reached the point where additional efficiency is needed. Teachers need to be able to have the time to actually teach, and districts need to find ways to do that while still dealing with severe budget challenges.

1 What Teachers Do Every Day, Experience.com. Retrieved February 13, 2012
   from http://www.experience.com/alumnus/article?channel_id=education&source_page=editor_picks&article_id=article_1133291019105.
2 McDowell, Lola (2012). Testing Our Schools, pbs.org. Retrieved and condensed on February 13, 2012
   from http://www.pbs.org/wgbh/pages/frontline/shows/schools/testing/theme.html.

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Bubble Sheet and Multiple Choice Testing: A Discussion of Specific Challenges & Benefits

Not long ago, it was justifiable to criticize multiple choice testing as reductive (Mitchell, 1992). Then, when President Obama seemed to target bubble testing, it seemed the educational ship was destined to steer in a different direction. The problem is that if the ship steers too far off course, students and districts may suffer. Bubble sheet and multiple choice assessments have too much to offer to abandon. The right choice may be to do a better job with this type of testing, more fully utilizing its advantages and the progress vendors have made with the technology that supports it.

Fortunately, bubble sheet and multiple choice testing are tools that have clearly progressed, due in large part to advances in technology. To understand how far modern solutions have come, it's necessary to look at the liabilities and limitations of traditional bubble sheet testing and scanning solutions.

These types of testing traditionally required the purchase of an expensive and potentially complicated dedicated scanning system and a large investment in time on the part of the teachers giving and grading the exams. Additionally, the costs of these dedicated scanning systems were not—and still are not—limited to the initial purchase. Costs often include the purchase of preprinted standardized forms (as opposed to plain-paper print-on-demand bubble sheet solutions) and special software to run the scanner and produce the reports. There is the recurring cost of maintenance and the cost of the support these systems need from IT. Training can also be time consuming and difficult, since certain software packages can be complicated. These solutions may also be limited in their test assessment capabilities and/or their ability to provide educators with other essential forms.

Fortunately, the liabilities associated with bubble sheet testing and multiple choice testing are being addressed—starting with the composition of the tests themselves, but also including some software and hardware solutions that now add efficiency and cost savings to what used to be an arduous process.

From an assessment standpoint, test designers are now producing more sophisticated multiple choice tests. These well-designed multiple choice tests can require considerable thought, even notes and calculations, before students can choose the proper bubble.

Current thinking holds that there are at least three advantages to using a multiple choice format for exams in courses that contain a reasonably large number of students.[3] First, research shows careful consideration of the results of item analysis can lead to significant improvements in the quality of exams written by an instructor. Second, the multiple choice format provides a consistency in grading that cannot be achieved when exams are graded by hand. Third, the use of the multiple choice format for at least a portion of each exam frees teachers to teach, rather than grade exams.

Other advantages of multiple choice testing include high reliability and the opportunity to test on more topic areas than with essay testing. Also, this type of testing can eliminate the opportunity for students to write large volumes of material, hoping to hit the points that are required for marks (Cranton, Pascal & Notar, 1977; Conkin & Serra, 1997; Fuhrman, 1996). While some have indicated that multiple choice testing can only test knowledge gained by rote memory or the memorization of isolated facts (Lowman, 1995), Davis (2001) advises that complex ideas and concepts can also be assessed.

3 Statistical Analysis of Multiple Choice Exams. Retrieved April 3, 2012 from http://chemed.chem.purdue.edu/chemed/stats.html#conclusions.

Four Questions To Ask About Your Present Solution

Districts presently using a scanning solution should consider the following questions:

1. Speed of scanning—is the solution fast enough to process the quantity required? With a scan speed of 50 ppm on the OKI MB700 Mono MFP, you can process a class of 25 tests in under a minute.

2. Is the solution flexible enough for multiple tasks? A dedicated scanner can only do one thing. MFPs, on the other hand, can perform the jobs of several devices, saving time and capital costs.

3. Are the right templates provided, and can you print them on demand on regular paper? This represents another cost savings.

4. What about security? Can you limit access to forms and results on the network?

Testing with Essays

With OKI School Docu Tool, teachers can prepare a test with bubble sheets consisting of 15, 30, 60 or 100 questions—including optional essay fields in the 15- and 30-question formats. Using the MB700 series MFP touch-screen panel, teachers simply print a blank bubble sheet for each student. Plus, an answer sheet will print out for teachers to complete with the correct answers, which will then be used for grading.

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Despite the doubts, the trend in bubble sheet and multiple choice testing is clear. Unhappy with student-learning trend data, administrators, school boards and legislators have been trying new approaches to improve and assess student learning—and bubble sheet testing is a part of that. Many states now rely on standards-based state accountability assessments that rely on the use of bubble sheet testing. Increasingly, these state test results are taking on heightened importance with incentives or consequences tied to test scores.

Another reason bubble sheet and multiple choice testing will likely be needed well into the future is their continuing use past high school and even past college. As young adults complete high school in the United States, they typically pursue one of three options: continue their education, enter the civilian workforce or join the military. In all three settings, there is a long history of using standardized tests of developed cognitive abilities for selection decisions. Why? Because they work.
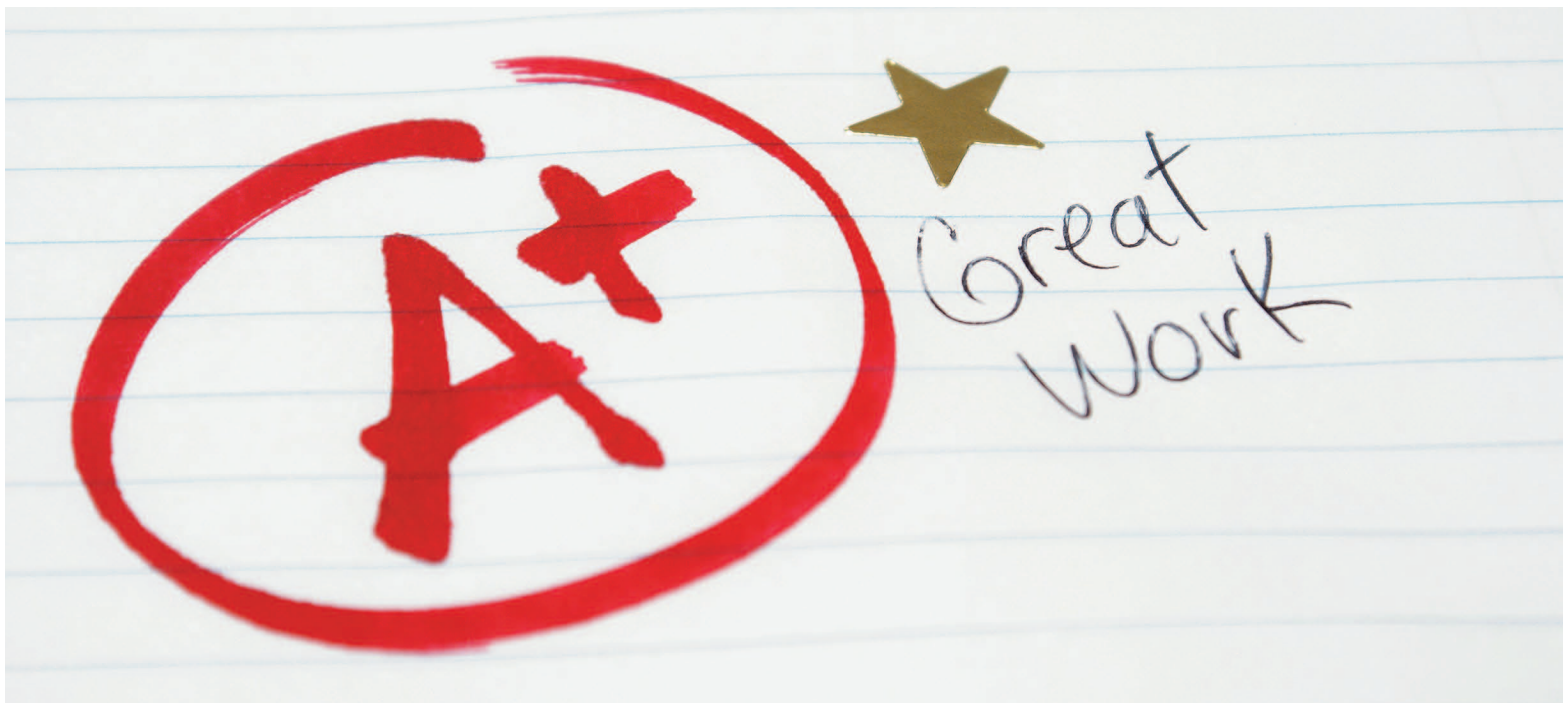
Research shows testing of developed abilities is generally valid for predicting short-term and long-term academic and job performance. The research also shows that testing validity is not tied to socioeconomic status; that coaching does not necessarily determine test performance; that tests do not generally exhibit minority bias; and that test-taking motivational mechanisms are not major determinants of test performance.[4]

While teachers must work with the wide variety of learning styles employed by their students, the literature suggests that multiple choice testing is appropriate for testing comprehension, application, content analysis (Fuhrman, 1996) and objective problem solving (Conklin & Serra, 1997)—but not for synthesis, evaluation (Cranton, 2000) or testing of writing skills (Fuhrman, 1996).

Instant Grading…?

It's possible with the OKI School Docu Tool. Using OMR technology to read the bubble sheets, instant grading is performed by comparing student answers to the master answer sheet. The server also provides reports to assist teachers with analyzing results by student, classroom and test question.

To grade the tests, teachers simply collect the completed bubble sheets, place the answer sheet on top of the stack and place them on the document feeder of the MFP for scanning. By clicking the "Grade Test" icon on the touch-screen panel, the tests are then scanned into the School Docu Tool server for grading.

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4 Sackett, P., Borneman, M. & Connelly, B. (2008). High stakes testing in higher education and employment: Appraising the evidence for validity and fairness. Retrieved March 12, 2012 http://andrewgelman.com/2008/06/standardized_te/.

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A Multiple Choice Testing Solution
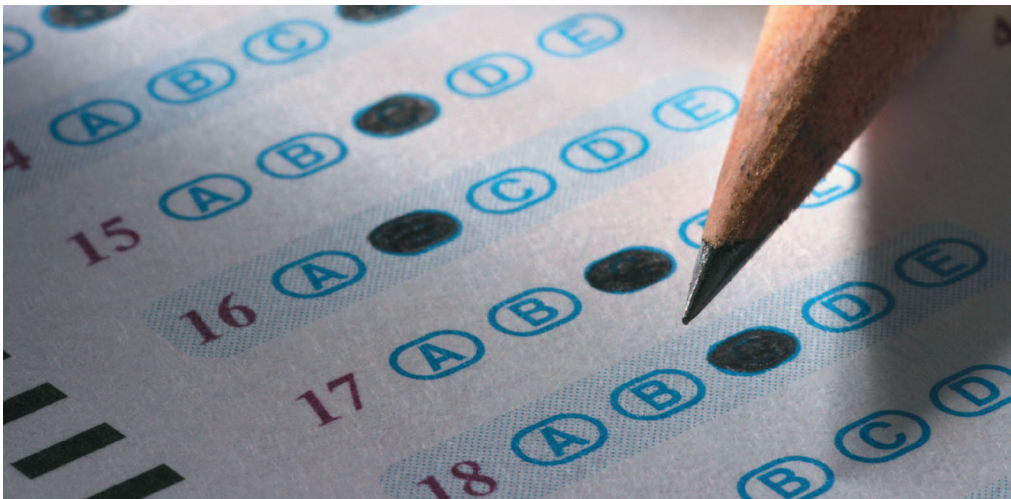## Solving Multiple Cost & Efficiency Challenges

More educators are discovering the versatility, cost savings and time savings associated with Multi-Function Printer (MFP) bubble sheet solutions, which enable teachers to take advantage of low-cost equipment to enhance testing.

The best of these solutions adroitly handle bubble sheet testing and many other document management tasks. MFP-based solutions are able to deliver ongoing cost savings and enhanced efficiency due to their ability to do several jobs—scanning, copying, faxing, printing and scanning to email—with just one device, while also streamlining the testing process. With an advanced MFP solution, educators can print, grade, assess and manage classroom test documents quickly and easily, providing teachers with more time to focus on the most important thing of all—teaching. Teachers can complete testing and paperwork tasks at the touch of a button, eliminating the hassle of taking stacks of test papers home to grade. They print the exact number of bubble sheet tests they need on demand (on low-cost plain paper), quickly grade the tests and print assessment reports in just a few minutes.

MFP solutions also enable teachers to rapidly scan documents to the classroom folder of their choosing and to access forms and other documents for immediate printing. This means there are no more costly preprinted forms to inventory, no waiting for results and no need to manually prepare reports. IT integration and training are essentially non-issues with the newer proven MFP solutions because they are easier to use, with minimal governance issues. The most advanced MFP solutions also include security safeguards such as requiring individual PIN codes to control who is using the device and how it is being used.

One example of increased efficiency is the Classroom Forms function offered by some solutions. This provides a way to quickly print a common document directly from an MFP with a simple click of the icon on the touch-screen panel, eliminating the need to request forms from the front office and enabling teachers to print on demand. These common documents may include, but are not limited to:

- Awards and certificates
- Bathroom passes
- Common stationery
- Library passes
- Medical forms
- Parent letters
- Parent request forms
- Permission forms
- Pop quizzes
- Sign-up sheets
- Student information forms
- Student work logs
- Substitute teacher forms

Advantages of MFP-based Testing

The latest generation of MFP-based solutions offers a range of benefits and features. Some of the main must-have features and benefits are:

- The ability to get a quick read on how the entire class is doing
- The added bonus of expanded scanning capability—to save time and money
- Instant grading with instant results for maximum efficiency
- Complete flexibility and simplicity from one device

Case Study: Inside the OKI MFP School Docu Tool Solution

OKI's School Docu Tool consists of two software components— a server that grades tests using Optical Marking Recognition (OMR) technology and an application embedded in the OKI MB700 series MFP to print and scan the bubble sheets and reports.

By integrating the one-touch ease of OKI MFP technology with a powerful suite of software tools, teachers can manage student testing documents more effectively.

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The Importance of Finding the Right MFP/Document Management Solution

Just as students have different learning styles, not all MFP solutions are similar.

For any district considering implementing bubble sheet testing, increasing its use due to budget or educational issues or wishing to switch to a more efficient and robust solution, there are key considerations.

The completeness of the solution, education-specific experience of the vendor, specific features, testimonials from users—all are vital to consider. Must-have features include print-on-demand bubble sheet quizzes and tests; instant grading results; full multi-function capabilities; prompt reporting; proof of cost savings; and simplicity of use access and security features.

Conclusion

While the "21st century classroom," with iPads, smart boards and laptops, remains a lively topic of discussion, education still must deal with a world where budgets are limited, teachers' time is difficult to come by and testing must be done efficiently. In reality, we are heading toward a world where schools implement a broader range of assessment skills—a world where bubble sheet testing remains an indisputably necessary tool. If that is the case, it's vital to find the right solution and the right partner.

For more information

Visit **okidata.com/schooldocutool** or
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For more specifics on the
School Docu Tool Solution, visit
www.okidata.com/instantgrading