

## **The Use of Computer Adaptive Testing and Data Driven Instructional Strategies Achievement in Private Education**

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### **Data Use in Private Education**

Private schools often tout their high academic preparedness. However, because private schools typically do not take the state mandated end of grade testing or use the curricula set by public schools, there is no comparable comparison of achievement. Public schools have been utilizing data to help increase student achievement for years. Data collected throughout the year on benchmark tests has allowed public school teachers the opportunity to change instructional practices to meet students' needs. Private schools have typically not had access to that level of formalized data leaving teachers to only guess how to differentiate among their students. Hattie (2009) stated that testing is only effective "if there is feedback from the test to teachers such that they modify their instruction to attend to the strengths and gaps in student performance" (p. 178).

As private school teachers continue to transition from a historically data poor environment to a much more data rich environment, it is imperative that they learn how to use the data to influence instructional practices to enhance student achievement. "An increased availability of technology, financial support from policymakers, and greater accountability for student outcomes have all contributed to the increased focus on data use for educational improvement globally" (Marsh & Farrell, 2015). One instrument that some private schools have recently adopted is the Scantron Performance Series (SPS). The SPS is a computer adaptive testing system used in reading and mathematics for grades first through eighth. The goal of the test is "to give immediate diagnostic information to each teacher, including learning objectives a student has not completed, and the academic gains made by individual and groups of students" (Scantron Corporation, 2014, p. 2). Students take the test three times per year: fall, winter, and spring. Each testing session gives the

teachers diagnostic data on how well their students performed on the test.

SPS is a norm-based test. However, it can also be aligned to any curriculum making it a criterion-based test. Teachers can now have instant access to the results, can see how they are progressing through the curriculum and how their students fared compared to the norm group. Many private school teachers now have access to an overwhelming amount of data that they are not used to. They are not only able to see what standards of their curriculum have been mastered but by which students. Access to these data at this level of detail allows teachers to individualize their instruction and group students more effectively.

While public school teachers' have had access to data to transform their instruction, it has also led to more planning time, individualized grading, and formative assessment throughout the school year. Private school teachers, without these data, have typically been able to teach to the middle thus seemingly having less outside the classroom work to do. A concern is that private school teachers will be overwhelmed with the 'extra work' they will now have and not embrace the data to change their practices especially in a system where it's believed there is no need for improvement. "I have been teaching for, fill in the blank, number of years and my students have always been successful" and "we have been recognized as a Blue Ribbon School of Excellence, we must be doing something right" are just two examples of troubling statements heard throughout the hallways of private schools as they begin to collect and use data. The creation of learning plans based on the data from the fall 2015 testing window creates the opportunity for administrators to have tangible goals to monitor teachers' progress. Information gleaned from the fall testing windows should shape the way teachers group, teach, assess, fill gaps, and help students grow throughout the year. Will the private school teachers rise to the challenge of data driven

instruction or will old habits prevail? Will they utilize the data to modify their instruction to improve student achievement? I am interested to see if the influx of data in private schools will be utilized by teachers to change instructional practices to increase student achievement and understanding.

### **Computer Adaptive Testing**

No current system is able to give results that are 100% accurate about student achievement. However computer adaptive testing (CAT) has a reasonable chance to estimate a student's ability. One of the main benefits of CAT is the instant delivery of data. Unlike paper tests, CAT are corrected instantly. Another major benefit is the ability for the test to offer questions that match the students' ability level. Questions fluctuate as students answer correctly or incorrectly offering teachers a clearer picture of potential student achievement (Clemens, Hagan-burke, Luo, Cerda, Blakely, Frosch, Gamez-Patience, & Jones 2015; Scantron Corporation, 2014).

The most notable motivating factor about CAT is the immediate feedback. This feedback allows teachers to formatively assess individual students and the class as a whole and make changes as necessary. Formative assessment has an effective size of .90 (Hattie, 2009). This ability is invaluable to educators and students as they have a greater understanding of students' knowledge and abilities. Using these data, teachers can find research-based strategies that have the potential to increase student achievement.

SPS defines reliability as "measurements are consistent when repeated on a population of examinees" and "SPS's goal is a standard error measure of less than .30" (Scantron Corporation, 2014). It defines validity as "should be considered within the context of the groups to be tested, and the desired interpretation of test results" (Scantron Corporation, 2014). SPS researched validity for content, item, sampling, and inter-testlet correlation. By utilizing specifically coded algorithms, CATs tend to deliver results within the standard error thus deemed to be a true reflection of test takers ability.

As we continue to move into a world of digital natives, it is important to remember that just

as all students do not have equal ability levels in content areas, students have different comfort levels with computers and computer programs. Once students become familiar with any CAT, they tend to do better than a traditional paper and pencil test. However, the setting of the test and how it is proctored make a difference. Students who take CATs increasingly like the instant feedback and believe that CATs are faster than traditional paper and pencil tests (Maguire, Smith, Student, Brallier, & Palm, 2010; Özden, Ertürk, Sanli, & Erturk, 2004).

### **Data Driven Instruction**

Public schools have been in an age of accountability for over a decade. With the passage of No Child Left Behind (NCLB), districts have been tasked with making sure all students passed minimum requirements beginning in third grade. As stated above, private schools have not taken these state mandated assessments. Accountability in private schools seems to be left up to each individual school grouping. In order to stay competitive, private schools have begun to find ways to gather, assess, and use data to impact instruction.

Data driven instruction (DDI), when done appropriately, has the ability to influence instruction to reach students on a more individualized level and increase student achievement. DDI cannot happen overnight and needs targeted professional development which will be discussed later in this paper. As stated earlier, CAT produce data instantaneously. This real-time data can be overwhelming (Kadel, 2010). Dunhost (2010) suggests five phases of DDI: "1. organizing for success, 2. building assessment literacy, 3. identifying data sources, 4. aligning data systems, and 5. altering instruction". These five serve as a starting point for teachers as they begin to try and make sense of the large world of DDI.

Despite a call for more DDI, most teachers are not equipped with the skills necessary to use data at their disposal effectively. Teachers often lack training, mentors, adequate time, adequate guidance from administrators, collaborative environments, and the ability to stray from the prescribe curricula when the data calls for it. More

professional development, both in teacher training programs and in the workplace, is needed to ensure that teachers are able to work with the data effectively (Dunn, Airola, Lo, & Garrison, 2013; Marsh, Pane, & Hamilton, 2006; Pella, 2012).

While CAT most certainly provides important data, it should not be the sole data point used when assessing student achievement. While public school policies may weigh heavily on DDI based on end-of-year test data, private schools have an opportunity to use multiple data sources. The question becomes what should qualify as data? As mentioned earlier formative assessment is a powerful tool to assess students when used appropriately. Both quantitative and qualitative data must be used. Again, teachers must be trained effectively on how to collect, analyze, and use the data (Donhost, 2010; Pella, 2012).

### **Instructional Strategies**

Marzano, Pickering and Pollock (2005) stated that “the ‘art’ of teaching is rapidly becoming the ‘science’ of teaching” (p. 1). Teachers have the ability, within their classroom, to select what they believe is the best way to reach their students. In that regard, teachers are the single most influential part of a child’s learning. Instructional strategies such as those listed by Marzano et al. and the meta-analyses done by Hattie (2009), help give teachers a map of how to better understand what works and what doesn’t in the classroom. Therefore, teachers must be sure to select strategies that are research-based. Professional learning communities (PLC) are a tested way that helps teachers work with peers to make sure research-based strategies are being used (Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006; Thomas & Green, 2015).

Most of the research used in this study, points back to Marzano, Pickering and Pollock’s (2005) nine categories: identifying similarities and differences, summarizing and note taking, reinforcing effort and providing recognition, homework and practice, nonlinguistic representations, cooperative learning, setting objectives and providing feedback, generating and testing hypotheses, and questions, cue and advance organizers (p. 7). Within each broad category, many instructional strategies are given. While these are

not designed to be a one-size fits all guidebook, each of these strategies has been shown to be effective in increasing student achievement (Thomas & Green, 2015).

Hattie researched six factors in regard to achievement to see what works in education: the child, the home, the school, the curricula, the teacher, and the approaches to teaching (Hattie, 2009, p. 31). Twenty-five of the forty-nine influences in the teaching domain had an effect size of  $<.4$ . Many of what we think works in the classroom is actually not working. While more research is constantly being done on each of them, it appears that further research has only solidified Hattie’s claims.

### **Professional Development**

It is often difficult to find one type of professional development that is effective for everyone. It is also difficult to define what is considered effective. One unifying theme of effective professional development is an increase in student achievement. However, there is little research that shows that professional development has a positive impact on student achievement. Hattie’s effect size is a .37 when professional development is related to increased student performance (Guskey, 2014; Hattie, 2009).

Studies have shown that research must be targeted, personal, and followed up with additional training and coaching for it to be effective. One-day trainings for the entire group are not effective. “Administrators face difficult choices in how to invest scarce resources to support data use and once invested, how to ensure that teachers gain, and sustain, the needed capabilities once the supports are removed” (Marsh & Farell, 2015).

There are several theories on how to make professional development more meaningful to student achievement. Ingram, Louis, and Schroeder (2004) researched organizational learning and continuous improvement. Organizational learning is geared toward long-term goals and system’s change, while continuous improvement stresses the use of data. Borko (2004) maps out a three-phase plan to help ensure professional development that

focuses on making sure it is planned well to answer the questions asked.

Despite research showing best-practices and research-based DDI, many teachers are still resistant to change and look for programs that either fit what they already do or dismiss programs as an educational fad. Teachers and administrators will need structure and strategies to ensure that professional development can in fact impact DDI which should in-turn change teachers selected instructional strategies which will hopefully result in higher student achievement and understanding. Teachers, administrators, parents and students will need training to understand data, its usefulness, and importance for DDI to be successful (Borko, 2004; Guskey, 2014; Ingram et al., 2004; Klein, 2007).

### **Conclusion**

CAT certainly has an advantage over traditional paper and pencil tests as it offers teachers the opportunity to have real-time data at their disposal. Furthermore, SPS offers teachers both criterion and normed data each of which can be useful in formatively assessing students throughout the year. Private school teachers are just beginning to be able to have access to useful data thanks to CAT. The use of the collected data can lead to better decision making in the classroom.

DDI, while seemingly obvious, is not always practiced correctly or in some cases at all. Teachers will need constant support in their teacher preparation programs and from administrators as they work to make DDI part of their everyday routine. Teachers will continue to need training to add to their skill-set and begin to feel comfortable using data. Collaborative grouping and the ability to veer from system pacing-guides are vital to DDI success. On the face of it, private school teachers have an advantage of working with their individual curricula and therefore potentially have the ability to make better use of DDI.

There is more than enough research that gives teachers instruction strategies that work. Teachers must be held accountable to changing their way of thinking if meaningful student achievement is to be gained. The work of Hattie and Marzano are simply two representations of

showing what works and why. Private schools have not normally been held to the same standards as their public counterparts. However, as more and more private schools are being accredited by various organizations, they need to be able to show that they too are using research-based instructional strategies to increase student achievement. Teachers will need support, coaching and professional development to make sure these changes occur.

Professional Development will continue to be time wasted until it too is implemented based on research. A clear definition of effectiveness must be created so that professional development can be evaluated on a clearly defined criterion basis. Decisions on targeted development with follow-up trainings is needed. More structure is needed to make sure that when professional development is given, it is meaningful and will make effective change or support effective practices already in place.

CAT combined with DDI and research based strategies offer private schools a chance to give evidence to the belief that they offer high-quality rigorous education to their students. Training will be needed for both teachers and administrators to ensure that the influx of data will not be pushed aside and old habits prevail. The freedom that many private schools have to deliver their specific curricula offers a chance for real DDI that can lead to growth in student achievement and understanding.

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