

# Is More Better?

## Measuring the Effects of Full-Day Kindergarten

Donna Surges Tatum, Ph.D.

**T**his is the dawning of the Age of Assessment. Legislatures, taxpayers, and parents are demanding accountability for the resources expended on our children's education. It is increasingly important for School Districts to conduct research. When schools implement new initiatives, they must be properly evaluated to ensure the best decisions concerning student learning. This research must use credible assessment tools which provide objective results to determine the efficacy of a program. We will examine an example of this proactive approach.

Current research in the neurosciences demonstrates the importance of early childhood education. The plasticity of children's brains in their first years of life mandates well-planned, well-executed pedagogy. Stimulating the neural pathways and building up strong networks in the brain has life-long implications. If schools provide early intervention and stimulus for students, it has great impact. Their readiness to learn is improved, increasing student progress.

Indianapolis Public Schools Superintendent Duncan N. P. (Pat) Pritchett, Jr. decided to test these ideas. In the fall of 1997 Indianapolis Public Schools (IPS) designed and implemented ten full-day pilot kindergartens to provide extended learning opportunities for general education students. Five of these classes are located in high schools, and five are in elementary schools. They are compared to five general education half-day kindergarten classes and thirteen Title I full-day classes.

In the summer of 1998, the District felt a sense of urgency in compiling data, as the Indiana State Legislature was considering a proposal to fund optional full-day kindergarten throughout the state. This report is prepared from data provided by Nancy E. Beatty, Title I Facilitator for the Indianapolis Public School District.

### The analysis answers the following research questions:

1. Do students in full-day programs make greater gains in academic readiness and language than students in traditional half-day programs?
2. Do full-day kindergartners in classrooms located in high schools do as well as kindergartners participating in full-day programs located in elementary buildings?
3. Are full-day kindergarten programs as beneficial to typical students as it is to children who are attending full-day programs for compensatory purposes?
4. Are gains broad enough in scope and sufficient in magnitude to warrant the extended program?

### Choose the Tools — Pre-Rasched for Best Fit

IPS used the Peabody Picture Vocabulary Test - Revised (PPVT-R) as one of the instruments to produce measures for their research. This is an excellent choice which demonstrates the strength of conclusions one can make with confidence when a tool is "Pre-Rasched."

The PPVT-R is an individually administered test of hearing vocabulary designed for persons 2-1/2 through 40 years of age who can see and hear reasonably well, and understand Standard English to some degree. In this sense, it is an achievement test, since it shows the extent of vocabulary acquisition. Though far from perfect, vocabulary is the best single index of school success.

The Peabody Picture Vocabulary Test was developed in 1959 by Lloyd M. and Leota M. Dunn. From a pool of 3885 words whose meanings could be clearly illustrated by black-and-white line drawings, the best 300 stimulus words and their decoys were chosen after careful and repeated field testing.



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A revised edition of the PPVT was introduced in 1981. This version is significant because it uses the Rasch/Wright latent trait model to precisely calibrate the difficulty of each item. This information was used to construct the PPVT-R so it is equally sensitive at all ages up to adulthood.

Two parallel forms contain 5 training items, followed by 175 test items arranged in order of increasing difficulty. Each item has four simple, black-and-white illustrations arranged in a multiple-choice format. The subject's task is to select the picture which best illustrates the meaning of a stimulus word presented orally by the examiner.

Testing requires only 10 to 20 minutes, because the subject need answer only 35 to 45 items of suitable difficulty. Items that are far too easy or far too hard are not administered. Scoring, which is rapid and objective, is accomplished while the test is being administered.

The "Pre-Rasched" properties of the PPVT-R are important. The PPVT-R test items have been calibrated using the Rasch/Wright model. This makes the item calibrations independent of the student sample taking the test. The result is measurement of student ability in precise, linear, standardized units. This is important because direct comparisons can thus be made for student progress over time, and for particular groups.

Growth curves are constructed for hearing vocabulary. The normal development table converts raw scores to W-ability. The cumulative percentages for W-ability are then converted to normalized Z scores using tables based upon the normal probability curve. For each of the 25 age groups the Z scores were converted to unsmoothed normalized standard score equivalents.

Think in terms of a ruler. The scores are marked off in equal intervals like inches. This means we can directly compare children, regardless of age, because of the normalized score adjustments. The population mean is 100 with a standard deviation of 15.

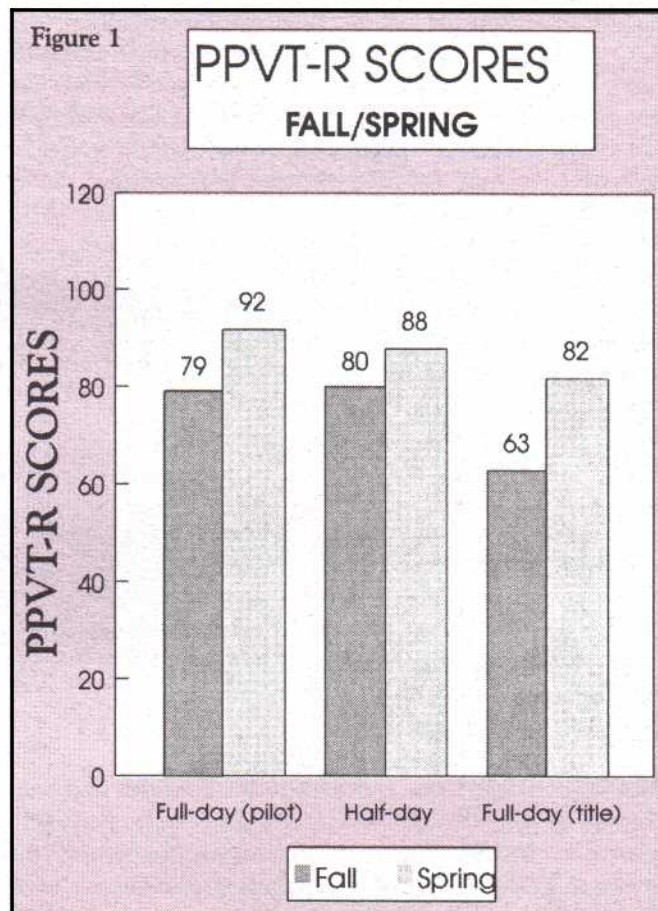
### Riveting Results

The PPVT-R was given to 440 kindergartners at the beginning of the 1997 Fall semester, and again at the end of the school year in Spring of 1998. The thirteen Title I full-day classes have 188 students and account for 43% of this sample. The ten pilot full-day general education classes comprise 36% and the five half-day general education classes 21%. Fifty-three percent of the students are female.

Figure 1 shows the results of the PPVT-R given to each kindergartner in the fall and then again in the spring.

All general education kindergartners started the school year with essentially the same entry level, 79/80. However, by the end of the year the full-day students had a significant gain of 14 points (from 79 to 92). The half-day students only gained 8 points (from 80 to 88).

The Title I full-day students were enrolled in the program for compensatory reasons. They entered school in the fall with the low entry level of 63, more than two and a half



standard deviations below the normalized average of 100. They exited kindergarten in the spring with a tremendous gain of over 19 points, with a score of 82, just a little over one standard deviation below the norm.

When PPVT-R measures are examined by class and by school, one finds answers to the research questions. It does not seem to make a difference whether the kindergarten class is in the elementary schools or the high schools. Individual teachers and/or schools seem to account for the variation in improvement level.

Gender did not make a difference in improvement for the general education students. However, the Title I girls improved on the PPVT-R by an average of 6 points more than the boys. (Female = 23 Male = 17) Are more linguistic opportunities available to girls in the classroom? Do teachers have more effective language activities for girls than boys? Perhaps some teachers have proven methods to share with their peers.

Another interesting finding about Title I girls is that they enter school 5 points below the boys on the PPVT-R. (Female = 60 Male = 65) Could this be because boys are given more attention and spoken to more in the home than girls?

### Discussion

The substantial gain made by students enrolled in the full-day pilot or the full-day Title I kindergarten programs is

enough to support the Full-day Kindergarten Initiative.

Research shows that the earlier the brain is stimulated, the bigger the influence. The difference between the two full-day programs and the traditional half-day kindergarten is overwhelming. Indianapolis Public Schools would be well-served to fund Full-Day programs as prevention, rather than spend more money in later years for remediation.

The full-day kindergarten strategy raises the threshold for student achievement. It produces academically stronger students who are better able to compete with the "norm." Higher test scores in later years will prove the efficacy of early intervention and stimulation with well-designed, well-implemented full-day kindergarten programs.

This study provides an objective method for teacher development. Teachers who produce large gain scores are identified. These teachers can work on peer-to-peer staff development to share their classroom techniques. Teachers who need support are also identified. A mentoring program could help these teachers improve their methods.

The school system's mandate is to educate children efficiently and effectively. Research and data analysis allows each initiative, each classroom, to become a laboratory. It allows administrators and teachers to work together to look at pedagogical programs and determine "Best Practices."

### Action Plans Work!

Using the Scientific Method with precise measurement and careful evaluation, we have the tools to make more informed, defensible decisions for the welfare of our children. That is exactly what Superintendent Pat Pritchett did. He presented the results of this study to the IPS School Board. He mailed a copy of the report to every legislator in the state of Indiana who would be voting in 1999 on Indiana House Bill 1689, which sets aside funding for optional full-day kindergarten. Pritchett made these results public to prove to taxpayers and legislators that the Indianapolis Public School District is actively involved in the search for the best methods and efficient use of funds to provide quality education for its constituency.

Indiana Governor Frank O'Bannon is strongly in favor of funding optional full-day kindergarten and is an active advocate of this initiative. On January 28, 1999 the bill passed the House Education Committee with only one vote against the proposal. This proves a proactive, research-oriented approach enhances and guides pedagogy as well as public policy. The \$111 million bill is Governor O'Bannon's number one priority in the General Assembly this year. We will let our readers know the outcome of the vote in the next issue.

The Indianapolis Public School District is to be commended for taking the lead to prove the efficacy of its programs. They have the courage to hold their programs up to the light of day in order to pursue their goal of providing the best possible education to their children. Their intellectual honesty will allow them to joyously proclaim their successes, and fix the programs which do not produce positive results. Proper measurement allows both accountability and the freedom to be creative and experimental. Immediate feedback produces immediate corrections.



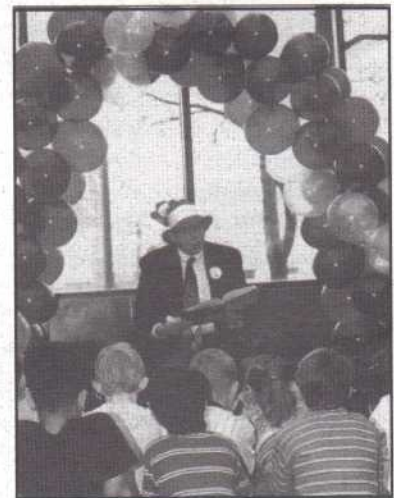
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*Indianapolis Public Schools Superintendent Pritchett reads to kindergartners as the "Cat in the Hat."*

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Donna Surges Tatum earned her B.A. and M.A. from Purdue University in Communication with an emphasis on Persuasion and Organizational Communication. She moved to Chicago upon graduation to join the "real" world. For seven years she worked in advertising and marketing until she realized that she was only in an alternate reality. She became a consultant and returned to academia, teaching at Roosevelt University. She was Director of the Communication Studies Department from 1986 to 1989.

Donna received her Ph.D. in 1991 from MESA at the University of Chicago. She has been teaching since 1990 in the Graham School of General Studies at the University of Chicago. It must mean something (she's not sure what) that she teaches the two courses most hated by most people: Public Speaking and Statistics.

In 1991 Donna started Meaningful Measurement, a consulting consortium for communication training, organizational development, market research, and educational assessment. Donna is Psychometrician and Director of Examination Activities for the American Society of Clinical Pathologists. Her leisure activities are swimming, yoga, and reading mystery novels.

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