Innovative Technology Improves Preschooler Readiness for Kindergarten
"An Action Research Project"
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Prelude

Retiring from a 42 year career in public education with the last 18 at the superintendent level I had one regret, I did not publish the results of our district action research. The Auburn School District completed a number of action research projects providing a number of high yield learning results for system design particularly impacting K-3. The district received an number of awards and recognition for systemic designs that produced high academic achievement despite challenging demographics. The fast moving, complex nature of public education with ever changing public policy year after year at the local, state and federal levels required the district to move, adapt and move again. Consequently, the district used the action research results to sustain an active focus on improving learning systems rather than on sharing and publishing the results. Those research projects included Innovative Technology to Improve K-3 Achievement, Preschool Partnerships with School District provide Early Learning Success, 3rd Grade Math and Reading Proficiency Proffer Future Success in High School Algebra and Graduation. All of these projects demonstrated that a district investment in system support for early learning promotes the mastery of skills implicit to standards, cognitive development and executive function that well serves the learner's academic future.

Introduction

The Project, "Accelerating Young Minds," was a unique partnership that included the Auburn School District, Kent School District, 20 Preschools, and Washington Department of Early Learning (DEL.) The project was conducted in the Spring of 2012 and involved 302 preschoolers aged 4 and 5. The purpose of this action research was to determine if personalized, technology software specifically designed for preschoolers would improve student readiness for Kindergarten. Neuropath Learning developed a program that was aligned to DEL Gold standards and WaKids standards for Kindergarten success. The software program emphasized a learning system based on brain research, reality based activities, early learning cognition, direct/mastery learning, and a monitoring system for individual performance. The meta-analysis work of John Hattie's Visible Learning for high yield targets and strategies was instrumental in the construct of the "Accelerating Young Minds" software.

Methodology

The project involved 302 four and five year olds residing in the Kent and Auburn School Districts. DEL provided a $25,000.00 grant so that students and families could have access to the software learning program at daycares, preschools, and home. Districts provided 21 training sessions for students and parents on the program design, purpose and operations. Neuropath Learning Institute provided technical support for the families. Because the project was not a school based/enrollment program, demographic data could not be gathered. However, the subjects reside in the Kent and Auburn School Districts which have similar

demographics with a 50 percent poverty rate, 51 percent minority population, and a 25% English Language percentage. For a period of two months during which the individual progress of each student was monitored. AYM operates a mastery based, visual, auditory, cognitive, and progressive system. The system measured student success on DEL Gold and WaKids standards. Over 3,500 tasks were incorporated as well as 95 unique cognitive objectives and 12,500 vocabulary words to measure the success of each participant via continuous assessment and feedback system. Mastery is based upon task performance, accuracy, time and application. Mastery levels included greater than 80 percent, greater than 60 percent but less than 80 percent and less than 60 percent.

Results

The results of the project were impressive both with the percentage of mastery and with the speed by which students demonstrated mastery. With just an average of 10 hours on the AYM software program 65 percent of preschool students demonstrated mastery (greater than 80% accuracy) and 18 percent of preschool students demonstrated mastery (greater than 60 % but less than 80%) while only 17 percent of preschool students demonstrated mastery below 60%. In other words, with just 10 hours in the program 83% of students demonstrated high levels of mastery or emerging mastery on the key standards of kindergarten readiness. More importantly for students below mastery, which falls at 60%, the program gives a customized profile guiding continued preparation for each preschool learner. For preschoolers, mastery level profiles for each learner create the opportunity for accelerated learning. Below is some summary data that highlight the subject performance on specific Kindergarten Entry Assessments:

Kindergarten Entry Skills	Mastery Higher 80%	Average Mastery Time
Letter Recognition/Consonant Sounds	**75%**	**20 minutes**
Vocabulary/Phonics	**93%**	**7 minutes**
Letter Sounds/Spelling/Word Parts	**85%**	**15 minutes**
Phonics - Initial Sound Substitution	**78%**	**16 minutes**
Counting/Estimation	**77%**	**8 minutes**
Order Numerals	**63%**	**5 minutes**
Patterns	**51%**	**8 minutes**
Language	**46%**	**9 minutes**
Syllables	**42%**	**8 minutes**
Behavior	**50%**	**7 minutes**

The project also collected data from the families regarding their participation in Spring project. The results are very positive. 82 percent of the participants used the programs at home and 100 percent of the respondents stated that their child enjoyed using the program. With the age of the students at 4 and 5, 67% of students were prompted by parents while 33 percent were self directed. Parents were very positive about the what their children were learning with 100 percent responding positively and 90 percent report that the program saves time in their efforts to help their children learn. A 100 percent of parents reported that they had no problems using the technology software and were impressed by how capable of learning their students were with the program. Parents were queried as to their preference in using a book or the software

for learning and results show that 67% of parents prefer using both a book and software while 33 percent preferred software only and 0 % indicated they prefer using a book only. And finally, 87 percent of parents indicated that they did not have to assist their child during use of the program.

Implications and Recommendations

The results of this project indicate that instructional technology is a viable learning tool for meeting early learning standards for preschoolers and Kindergarteners. It is important that software technologies must align with best practice classroom instruction that employs high yield targets and strategies in a personalized way that provides feedback and continuous improvement towards mastery for each student. The use of technology proved expeditious for accelerated learning and cognitive development, with the strong self-learning aspect of the software tool. One preschooler reported, “the game is pretty easy to do, but I like it that if one part isn’t easy than I get to do it again and again and again until I get it better.”

The use of effective instructional technology at the preschool level suggests that this may be a vehicle for addressing learning gaps before the start of Kindergarten as well as providing useful learning data as preschoolers enter public or private school. There were few barriers for parent access to computer technology but preschools lacked the facilities and resources for utilizing the program effectively. Parents in this project were avid supporters of their children using technology to learn. It appears that the use of technology is a cultural manifestation of the new parent generation.

Barriers to the use of technology may exist in the early grade levels at the public school level where traditionalists may reject the use of technology based on early television program learning research in the 1980s. Failure to recognize that the effective use of artificial intelligence for active, self learning based on cognitive development research is a major misstep in efforts to accelerate learning for all students. Additionally, learning technology is not bound by the resource constraints of a traditional classroom. Rejection of early learning technology also ignores the early learning brain research that implores that critical timeframes for enhanced cognitive development particularly executive function in early learners.

More research is needed on for the development early learning technology. The application of early learner brain research, play as learning, adult mediation of language and cognition development and executive function research are key elements for future software development. After all, the new K-12 Common Core standards are ultimately an emphasis on the development of a fund of knowledge through active memory and critical thinking skills. So with the ever changing impacts of governmental education policy, it is recommended to start or stay the course for systemic structures that provide personalized, visible learning, including technology systems for early learning achievement.