



# Computer Aided Instruction and Academic Achievement: A Study of the *A+nyWhere Learning System* in a District-Wide Implementation.

A Digest of Research on the *A+nyWhere Learning System*

Today there is a growing awareness of the impact of technology's on students learning. This study examined the effects of the implementation of the *A+nyWhere Learning System (A+LS)* on academic achievement as indexed by the Iowa Tests of Basic Skills (ITBS). *A+LS* is a modular, core curriculum system that provides flexibility to create individual lesson plans, assess student skill deficiencies, and edit curriculum content. The program contains over 6,000 lessons and 100,000 exercises, supplying over 6,700 hours of technology-based instruction. This software features integrated assessment and automated reporting tools that are aligned to all state and national academic standards. It utilizes direct instruction that is uncluttered and focused.

This study utilizes a research design based on naturally occurring nonequivalent groups. The study involved four elementary schools in a suburb of Chicago, Illinois, over the course of two school years: 2001-2002 and 2002-2003. While all schools provided a variety of computer programs for student use, only two of the schools specifically directed the faculty to use *A+LS* to improve student achievement. These two naturally occurring school groupings were labeled "*A+LS* Encouraged" group (comprised of 522 students where teachers were encouraged to use *A+LS*) and the "*A+LS* Permissive" group (comprised of 458 students where the teachers were directed to only use the computer laboratory resources). In all of the schools, the delivery of *A+LS* to the students was essentially equivalent. After the 2002-2003 school year, ITBS reading and math grade equivalents, total time spent using *A+LS* software, total *A+LS* lesson time, and total *A+LS* assessment time were collected for each student.

District 159 is an elementary school district with approximately 1700 students located in the urban fringe of a large city. This sample consisted of 980 children from grades two through eight. Only those who used *A+LS* and who were present for both ITBS administrations were included. The majority of the students attending the four schools being studied were African-American students (88.1%) with the remaining students split among whites (8.1%) and other minorities (3.8%). Approximately 35% of the students at the four schools were receiving free or reduced lunch. The schools were similar in both ethnic background and percentage of students receiving free/reduced lunch.

Five hypotheses were tested for differences between *A+LS* Encouraged group and the *A+LS* Permissive group:

1. in total usage time of *A+LS* by the students,
2. in ITBS reading achievement gains (i.e., pre and post test difference),
3. in ITBS mathematics achievement gains (i.e., pre and post test difference),
4. in levels of use of *A+LS* diagnostic/prescriptive tools as measured by ITBS reading gains,
5. in levels of use of *A+LS* diagnostic/prescriptive tools as measured by ITBS math gains.

## Results

Hypothesis 1: The statistical analysis found the *A+LS* Encouraged group had significantly higher amounts of total *A+LS* time use than the *A+LS* Permissive group ( $p < .01$ ). The students in the Encouraged group used *A+LS* for an average of 13.56 hours (about 22 minutes per week) while

the Permissive group students used *A+LS* for an average of 13.75 hours (about 14 minutes per week).

Hypothesis 2: The analysis revealed that the *A+LS* Encouraged group had significantly higher ITBS reading gain scores than those in *A+LS* Permissive Use group (.14 higher,  $p < .05$ ). Individual schools were shown not to be a significant confounding factor.

Hypothesis 3: The analysis revealed that the *A+LS* Encouraged group recorded significantly higher ITBS mathematics achievement gains than the *A+LS* Permissive Use group (.20 higher,  $p < .01$ ). Individual schools were shown to be a significant factor thus confounding the differential gains between the two *A+LS* groups.

Hypothesis 4: The effect of differential amounts of use of the *A+LS* diagnostic/prescriptive tools on the ITBS reading gain scores was tested by creating a 2 by 4 between-group design. This was done by splitting both the *A+LS* Encouraged and *A+LS* Permissive groups into four groups representing the four quartiles of use of the *A+LS* assessment system. The analysis indicated that the interaction between the four groups of *A+LS* diagnostic use and the two groups of *A+LS* Encouraged or Permissive use was significant ( $p < .05$ ). The middle two diagnostic/prescriptive tools use quartile groups registered significantly greater ITBS reading gains than the outer two quartiles, but the greatest gain was for the upper middle assessment use group from the directed *A+LS* use school.

Hypothesis 5: The effect of differential amounts of use of the *A+LS* diagnostic/prescriptive tools on the ITBS mathematics gain scores was tested by creating a 2 by 4 between-group design. This was done by splitting both the *A+LS* Encouraged and *A+LS* Permissive groups into four groups representing the four quartiles of use of the *A+LS* assessment system. While no interaction between the groups was found, there was a main effect between the level of *A+LS* diagnostic use and growth in ITBS mathematics scores ( $p < .01$ ). The middle two diagnostic/prescriptive tools use quartile groups registered significantly greater math gains than the outer two quartiles.

## Conclusion

This study investigated the effects of using the *A+nyWhere Learning System* on academic achievement in a school district in the fringe of a large urban area. The study showed that schools where the use of the *A+nyWhere Learning System* was encouraged used the software more than the neighboring schools where the use of the *A+nyWhere Learning System* was only made available. More importantly, the schools where the use of the *A+nyWhere Learning System* was encouraged and used more had greater gains in both reading and mathematics as measured by the Iowa Tests of Basic Skills. Additionally, *A+LS* has features to permit teacher directed assignment of lessons or assignment of lessons based on student performance on assessments (data driven instruction). Findings indicated greater academic gains for students whose assignments were generated by assessment results. Research utilizing designs that incorporate a more consistent student use of the *A+LS* software, manipulation of the use of assessment tools, and employment of random assignment to groups is needed to further investigate the effects of the *A+nyWhere Learning System* impact on students' learning.

Thomas Trautman Ed.D.  
The American Education Corporation

Robert Klemp Ph.D.  
Illinois School District 159