SUMMARY OF HSOS RESEARCH FINDINGS

Evaluations of our workshops have yielded a great deal of insight regarding the effectiveness of *A Head Start on Science* professional development. And while internal evaluation has been a routine part of the project, we have also supported the development and dissemination of research assessing the project's effectiveness. Findings that have been reported are largely of two types, impacts on Head Start teachers themselves and the subsequent impacts on their students and classrooms. Each of these is addressed in turn, below.

Impacts on Teachers

In evaluations of our workshops we have seen great growth in teachers comfort levels with regard to doing science with their classes. At one time, only 10% of teachers entering our workshops reported they were "very comfortable" with science, but by the end of the workshop more than half of the participants described themselves with this highest ranking (i.e., "very comfortable") (Von Blum, 1998). These findings mirror those of a second study (Van Egeren, Watson, Morris, & Farrand, 2007) which showed that participating teachers showed much greater self-efficacy with regard to science teaching, than a similar control group that did not attend *A Head Start on Science* workshop. Using different measures, a more recent study of teachers' attitudes and beliefs (Straits, Casillan, & Ritz, 2014) also found significant increases with participating teachers' comfort in teaching science.

In addition to teacher comfort with science, two of these studies also investigated the overall value for children that preschool teachers placed on science. Results suggest that teachers who participated in *HSOS* professional development, grew significantly in their own valuing of science (Straits et al., 2014) and that the value that participating teachers placed on science for children was significantly greater than that of similar teachers who did not participated in *HSOS* (Van Egeren et al., 2007).

Impacts on Classrooms and Students

The positive teacher impacts described above did not end at the workshop, but translated into classroom practice. Van Egeren, et al. (2007) showed that participating Head Start teachers became more confident in engaging students in a wide range of science activities and classroom observations showed participants were more likely to use active learning strategies than non-participating teachers. Further, our participants reported an impressive increase in the frequency of science lessons; the percentage of teachers reporting the use of daily science instruction nearly doubled (Von Blum, 1998). Most importantly, teachers came to believe in their students' abilities a science learners (Von Blum, 2003) and through their increased appreciation for and use of active, hands-on science instruction students improved their science thinking

skills, performing much better than the students of non-participating teachers in tests of scientific concepts and reasoning (Van Egeren et al., 2007).

REFERENCES

Straits, W. J., Casillan, R., and Ritz, W. C. (2014, December). *"A Head Start on Science" Professional Development Workshops*. Presented at the western regional meeting of the Association for Science Teacher Education. Long Beach, CA.

Van Egeren, L. A., Watson, D., Morris, B., and Farrand, M. (2007, February). *Creating School Readiness through Early Childhood Science Education: Evaluation of Head Start on Science*. University Outreach & Engagement, Michigan State University, East Lansing, MI.

Von Blum, R. (1998). *A Head Start on Science - Final Evaluation*. National Center for Science in Early Childhood, California State University Long Beach, Long Beach, CA.

Von Blum, R. (2003). *National Dissemination of A Head Start on Science - Final Evaluation Report.* National Center for Science in Early Childhood, California State University Long Beach, Long Beach, CA.