



EARLY ELEMENTARY SCIENCE PARTNERSHIP (E2SP) THREE-YEAR SUMMATIVE REPORT EXECUTIVE SUMMARY

The Early Elementary Science Partnership is a school-based intervention that directly impacts all K-3 teachers, school support staff and school administrators in participating Chicago Public Schools to improve students' science comprehension and achievement.

Program Description

The Early Elementary Science Partnership (E2SP) is a partnership among The Field Museum, the Peggy Notebaert Nature Museum, Chicago Children's Museum, Lincoln Park Zoo, Chicago Public Schools' (CPS) Office of Teaching and Learning - Science, and Northwestern University. The E2SP program targets all K-3 teachers, school support staff and administrators in participating CPS schools and is designed to provide them with professional development at partner institutions directed at improving their science content knowledge, understanding of and ability to teach science through inquiry, and use of museums and other informal learning resources to teach science. The E2SP also seeks to build capacity for participating schools to create a learning community among early elementary educators focused on high quality science instruction. Finally, as a result of school participation in professional development, the E2SP seeks to improve students' science content knowledge, understanding of science, and ability to do science through inquiry.

The key elements of the E2SP program include: 1) **Professional Development** - Science Content Seminars and Museum Training provided by partnering informal science learning institutions that enrich the Chicago Public Schools science curricula for K-3 teachers; 2) **Focused Field Trips** at partnering informal science learning institutions; 3) **Instructional Support** for participating K-3 teachers during classroom science instruction and at museums during field trips; and 4) Activities designed to develop the capacity of schools to build a learning community of early elementary educators focused on science instruction, including **University-Based Coursework** providing teacher leaders with information on recent research on science learning, instructional innovations and leadership, and **School-Based Professional Development** focused on needs assessment and school routine development surrounding science instruction.

Program Impact

To provide information about the extent to which the E2SP reached its goals, the Center for Elementary Mathematics and Science Education (CEMSE) at the University of Chicago was contracted to evaluate the three-year pilot program. The evaluation of the program was framed by four questions:

Evaluation Question 1

To what extent did teachers demonstrate changes in instruction, science disciplinary content knowledge, inquiry content knowledge and attitudes about science and science teaching?

There was concrete evidence of improved science content in E2SP teachers.

Interviews and Museum Educators (MEs) log data across the program's duration support questionnaire findings that teacher's content knowledge improved. During interviews, teachers generally reported more confidence with science content, largely attributed to E2SP support. MEs also noted that many teachers were able to effectively articulate science content knowledge in the classroom, though data also indicated that some teachers still struggled with basic science content knowledge.



E2SP teachers demonstrated comfort with basic inquiry strategies.

The majority of teachers implemented desired inquiry strategies. For example, teachers used probing questions, thus students were asked to explain reasoning and support conclusions with evidence. Principals and assistant principals interviewed in Year 3 indicated that some changes in teachers' use of inquiry were taking place. However, higher-level inquiry strategies (such as analyzing subject-specific text and considering alternative explanations or arguments) were still being implemented at lower levels compared to other inquiry strategies.

The vast majority of teachers felt that E2SP has improved their science instruction.

Teachers had a very favorable attitude to the E2SP based on questionnaire and interview data. In addition, teacher interview data indicate that teachers perceived the impact of the E2SP program to be integral to their science instruction. Questionnaire responses over the course of the program indicated that teachers in the E2SP program showed greater confidence in their preparation and ability to implement science curriculum.

Evaluation Question 2

To what extent did teachers use museums and other informal learning resources to teach science?

E2SP resources have been very useful to teachers' science instruction.

Teachers' questionnaire responses indicated a large majority of teachers value the resources provided by the museum educators (e.g. content seminars, model lessons, museum trainings, instructional support). Teachers often felt that the Museum Educator visits to the classroom were amongst the most beneficial supports of the program, though they also spoke highly of the professional development sessions.

MEs provided teachers valuable feedback on their science instruction.

Evidence from ME logs in Year 3 indicated that MEs' feedback and conversation with teachers was targeted and thoughtful, thus supporting teachers science instruction. Interactions between MEs and teachers occurred with ease and teachers were clearly comfortable expressing concerns and needs to MEs. While interactions with MEs facilitated implementation of inquiry and effective science content in the classroom, it was sometimes difficult for the evaluators to sense teacher taking ownership of strategies learned in the E2SP.

There is evidence that teachers incorporated museum resources into their science instruction.

In Year 2 teachers were observed enacting science lessons in their classrooms, they often incorporated materials, knowledge, and instructional practices that were provided through E2SP professional development and other program activities. At the conclusion of Year 3, teachers also reported they have used E2SP field trip model lessons to supplement classroom instruction and will continue to use the E2SP field trip model lessons if they visit an E2SP institution next school year.

Evaluation Question 3

To what extent did program activities build capacity to create a learning community of early elementary educators?



Teacher Leaders increase the chance that the program can be sustained at their school.

Schools with remaining teacher leaders have an expert resource in science instruction and leadership practices. Over the 3 years of the program, responsibilities for the TLs included leading collaboration meetings, serving as the school's main contact for the E2SP program, and checking on the status of science materials at their school. TLs reported that university coursework provided content and leadership skills needed to fulfill their role in building learning communities at their school. However, there were factors at TLs' schools that affected their role. TLs reported having different degrees of support from school administration and were affected by the amount of authority given to them to make decisions regarding science instruction.

Schools increased science collaboration meetings during the course of the E2SP.

Prior to enrolling in the program, the majority of schools did not have formal collaboration structures that supported science. The collaboration meetings have brought teachers and school leaders together to focus on science instruction. E2SP staff has been instrumental in organizing teachers for collaboration, and thus, teachers' participation in the meetings has increased over the course of the program. However, there have been a number of factors in each year of the program that challenge the development of a school-based learning community.

Evaluation Question 4

To what extent are students demonstrating changes in science content knowledge, understanding of science, and ability to do science through inquiry?

Students in E2SP classrooms are engaged in science inquiry.

Teacher questionnaire findings indicate that each year the program progressed, a greater number of teachers reported students engaging in inquiry activities. Case study observations provided more detailed accounts of students engaging in inquiry activities in which students observed, supported their conclusions with evidence, recorded data, communicated their findings, made predictions, made scientific drawings, analyzed data, wrote down their observations, and compared and contrasted their observations. Field trip observations in each of the years also demonstrate that students are "doing" science. In the student focus groups, students reported learning science content, engaging in inquiry, and gaining an understanding about the processes one engages in while doing science.