CHAPTER 27

THE IOWA CHAUTAUQUA PROGRAM: A PROVEN IN-SERVICE MODEL FOR INTRODUCING STS IN K–12 CLASSROOMS

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THE ORIGINAL CHAUTAUQUA

The Iowa Chautauqua Program was created in 1983 when the National Science Teachers Association received major support from the National Science Foundation (NSF) to initiate a national Chautauqua program designed to improve kindergarten through twelfth-grade science teachers and courses. It was modeled after the highly successful Chautauqua Program of the American Association for the Advancement of Science project, which was also supported by NSF for two decades as a major effort to improve science teaching at the college level. Iowa was selected as one of seventeen states for the NSTA-NSF Chautauqua Program.

Basic to the Chautauqua model is the identification of new course titles-themes, nationally recognized instructors, and teachers and classrooms ready for some innovative practices. The program initially included only two short courses—one organized in the fall to share new ideas and approaches and one in the spring designed for the participants to share experiences, to synthesize the results, and to formulate a model for staff development. Such was the AAAS Chautauqua model, which was immensely popular and successful as a program to improve college science classrooms.

The Iowa Chautauqua Program for kindergarten through twelfth-grade teachers was established to introduce teachers to the emerging STS reforms that were receiving national attention from the NSF research effort called Project Synthesis. STS was one of the curriculum components headed by E. Joseph Piel (College of Engineering, Stony Brook). STS had been identified as a focus

area for Harms's Project Synthesis (Harms and Yager, 1981). Dr. Piel was selected as the primary instructor for the Iowa Chautauqua effort, which operated as an NSTA-NSF effort during the 1983–1986 interim. He was the logical person to lead the effort since he was selected by Harms to head the STS focus group for Project Synthesis (Harms, 1977).

As with any new project, changes were adopted based on experiences from previous years. Initially the project included work with thirty teachers with fall awareness sessions concerning STS, a three- to five-week curriculum model tried in the classrooms of participating teachers, and the spring report and synthesis session. After one year the Iowa Utility Association (made up of all investor-owned utilities in the state) volunteered to be a cosponsor of the Iowa Chautauqua Program. This meant increasing the program to include five sites each year with thirty to fifty teachers enrolled. These five centers were rotated on a three-year cycle to be located in each of the fifteen Area Education Agency/Community College geographical regions of the state.

Other NSF funding and Eisenhower grants to higher education institutes in Iowa permitted a new element added to the Chautauqua model. A three-week experience with learning science in an STS format means that teachers can try a five-day module before the Fall Short Course. This meant more time could be spent on assistance with the use of instructional technologies and on assessment strategies prior to trying the STS strategies with any of their own students.

With 250 new teachers enrolled for the 1992–1993 academic year, the total number of teachers who have participated over a seven-year period numbers 1,700. These teachers have been employed in 283 of Iowa's 431 districts. A total of thirty of the most successful teachers are recruited each year to become Lead Teachers. They are enrolled in a two-week Leadership Conference in June as plans for three-week summer workshops and the short courses for the next academic year are finalized.

For the Iowa Chautauqua Program the NSTA descriptions of STS are used to characterize the STS modules, which are tried for four to six weeks in kindergarten through twelfth-grade classrooms (between the fall and spring short courses). These features include: (1) student identification of problems with local interest and impact; (2) the use of local resources (human and material) to locate information that can be used in problem resolution; (3) the active involvement of students in seeking information that can be applied to solve real-life problems; (4) the extension of learning going beyond the class period, the classroom, and the school; (5) a focus on the impact of science and technology on individual students; (6) a view that science content is more than concepts that exist for students to master on tests; (7) an emphasis on process skills that students can use in their own problem resolution; (8) an emphasis on career awareness—especially careers related to science and technology; (9) opportu-

nities for students to experience citizenship roles as they attempt to resolve issues they have identified; (10) identification of ways that science and technology are likely to impact the future; and (11) some autonomy in the learning process (as individual issues are identified).

The STS classrooms are also seen as those that can be contrasted with textbook dominated classrooms. These contrasts include:

Textbook	*STS*
1. Textbook visible and used frequently	1. Textbook used only when it is needed as source of information
2. Teachers provide information for students to record and to repeat on tests	2. Teachers assist students in finding answers to their own questions; teachers rarely provide information (answers to student questions)
3. Activities are all prescribed, including goals, procedures, and often the results	3. Students plan activities as a way of testing their own ideas and explanations
4. Teachers rarely in communication with persons outside their own classrooms	4. Teachers utilize other teachers, parents, and experts in the community as sources for information and ideas
5. No focus on current problems and issues	5. Current problems and issues often provide the context for study
6. Science defined by what information is included in the textbook	6. Science defined as questions, possible answers to questions, and testing the possible answers that emerge
7. Teachers plan each lesson carefully	7. Teachers focus on goals and involve students in planning activities, actions, and sources of information
8. Teachers rarely admitting they do not know something arising in discussions	8. Teachers frequently admitting to not knowing; this stiuation is used to plan group actions to deal with an initial "not knowing" starting point
9. Student doing what text and teacher direct them to do	9. Students proposing actions, information sources, and new questions
10. Focus on words and terms from textbook	10. Terms rarely used as a focus by themselves; special terms are used only after meaning has been established

Textbook	*STS*
11. Science not viewed as operating in the school and/or community; that is, no local relevance	11. Nearly all questions, issues, and class activities have a base and a relevance at the local level
12. Ideas and information presented for mastery	12. Ideas and information sought out to respond to issues and questions
13. No use of newspapers and current periodicals	13. Frequent use of news reports and current situations
14. Much work on text and teacher-prepared worksheets	14. No work on text and teacher-prepared worksheets
15. Much time spent by teacher in preparing lessons	15. Students involved as much (if not more) than teacher in preparing for individual lessons
16. Class discussion and laboratories focus on competition and getting "right" answers	16. Discussion and laboratories focus on responding to issues, questions, and problems—often in a cooperative mode
17. Quizzes and tests focus on student recall	17. Evaluation focuses on what students can do; that is, how they can use information and skills
18. "Science" contained in place called science classroom or laboratory	18. Science in evidence in school as whole, the community, and the lives of students

The Iowa Chautauqua Model is summarized in Figure 27.1. The advantages that the program has shown to provide include:

1. awareness of a reform effort (STS) in a nonthreatening environment;
2. direct teacher experience with STS instruction (three-week summer workshop);
3. experienced STS teachers as vital parts of staff team;
4. assistance with planning a grade-level and school specific module;
5. encouragement to try the new module;
6. a focus on assessment strategies that are designed to provide evidence of the success (and failures) of new approaches;
7. a chance to compare results of STS teaching (Spring Short Course);
8. encouragement to communicate about the new efforts with STS (professional meetings, local staff development, and Leadership Training).

The effectiveness of the Iowa Chautauqua Model has been established by the Program Effectiveness Panel of the National Diffusion Network. The model

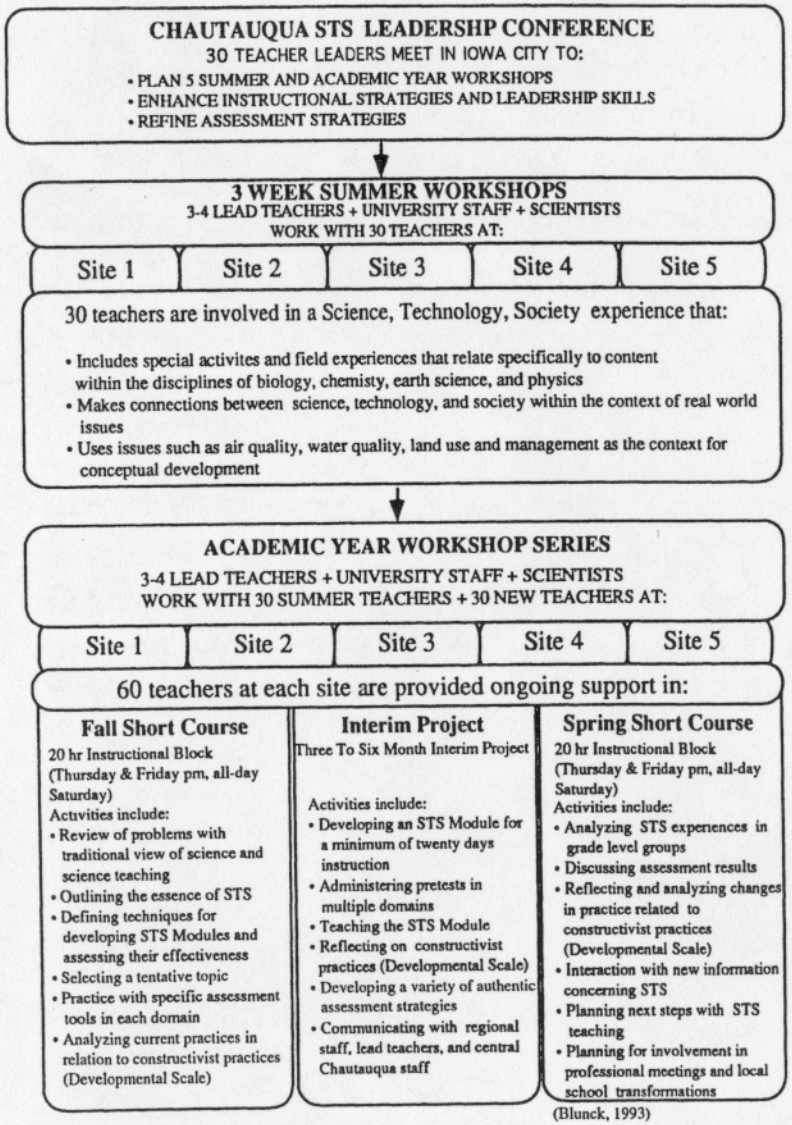

FIGURE 27.1 The Iowa Chautauqua Model

can be disseminated to other states or smaller geographical areas to assist schools and teachers with reforms. Specific claims were verified as established by the Program Effectiveness Panel. They include:

I. The Chautauqua Program increases teacher confidence for teaching science.
   A. Planning science lessons.
   B. Involving students actively in learning.
   C. Matching goals with curriculum and instruction.
II. The Chautauqua Program increases teacher understanding and use of the basic features of science.
   A. Including focusing on questions.
   B. Including generating teacher- and student-generated explanations.
   C. Including teacher- and student-devised tests for determining the validity of explanations.
III. Lead Teachers involved with the Chautauqua Program are more able to stimulate their students to grow in six domains of science learning (compared to class sections where the techniques emphasized in the Chautauqua program are not used).
   A. A significant number of basic concepts are mastered (but not more than in traditional courses where the exclusive focus is on concept mastery).
   B. Students better understand basic processes of science.
   C. Students can apply concepts and processes to new situations.
   D. Students develop more creativity skills.
      1. Questioning.
      2. Proposing causes.
      3. Suggesting possible consequences.
   E. Student attitude is more positive following instruction.
      1. Toward science classes.
      2. Toward science teachers.
      3. Toward usefulness of science to them.
      4. Toward science careers.
   F. Students improve in their understanding of the basic features of science.
      1. Science means questioning, explaining, and testing.
      2. Science deals with activities that affect living in homes, schools, communities, and nations.
      3. Science is a human activity that involves acting on questions about the universe.

The evidence is abundant concerning the advantages of STS (Yager, 1989, 1990*a*; Yager, Myers, Blunck, and McComas, 1990). And, STS has been found to be most effective with female and minority students (Iskander, 1991; Liu, 1992; Lu, 1993; Mackinnu, 1991). The evidence is also clear

that the Chautauqua is an exemplary inservice model correcting many of the problems noted with inservice education. These advantages include:

1. Planning, implementing, and evaluating involves all stakeholders; collaboration is evidenced for every aspect;
2. Inservice is well-planned and provides ongoing support; frequent opportunities for individual and collegial examination and reflection on instructional and institutional practices is provided;
3. All stakeholders help set clear and achievable goals;
4. Needs of teachers, school, and community are considered in setting realistic goals;
5. Inservice program is integral part of total school program providing teachers with ongoing support; a developmental approach is used;
6. A wide range of instructional strategies are used to accommodate teacher differences;
7. Instructional approaches focus on learning science content through the perspectives and methods of inquiry;
8. Theory, modeling, practice, and feedback are integral parts of the instructional process;
9. Choice is provided; teachers choose the experiences that best fit their needs;
10. Focus on changing teacher behavior;
11. Intrinsic and extrinsic incentives are part of the program, emphasis is placed on intrinsic rewards;
12. Positive leaders help create a shared vision and commit funds, time, materials, and human resources;
13. Administrative staff participates in the inservice;
14. Applications of adult learning principles are evidenced in all phases of the program;
15. Fostering a positive self-concept is the guiding force; professionals come to view themselves as life-long learners; and
16. Programs are ambitious and complex; evaluation is ongoing providing for continuous improvement.

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