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A Survey Study on Four Groups' Feelings about the Effectiveness, Enjoyment, and Problems They See with the 9thGrade SS&C Course : Case Study at North Carolina Project Site

Toshihide HIRANO*

平野　俊英
第9学年SS＆Cコースの試行にともなう四群への効果・享受・問題点に関する調査研究
：ノースカロライナ州プロジェクトでの事例

[Key Words: NSTA SS&C Project, High School Level, Science Curriculum Reform, Curriculum Assessment

I. Introduction

NSTA's SS&C Project

The National Science Teachers Association's project on Scope, Sequence, and Coordination of Secondary School Science（SS&C）was a national level science curriculum reform movement in 90's USA. The goal of SS&C project was to prepare the scientifically literate population that will be necessary for America to compete and prosper in the global, technologically advanced economy and society of the 21st century. In 1989, SS&C project was conceived by NSTA's Executive Director Bill Aldridge, and introduced at middle school level at two sites - California and Texas. Since 1990, SS&C project had been introduced at four pilot sites -North Carolina, Iowa, Puerto Rico, and Alaska. In 1992, NSTA published the curriculum design guide called ***The Content Core*** which suggested topics in each discipline studied at secondary school level. Building on the middle school level experiences, NSTA conducted a project to develop the SS&C program in grades 9-12.

The SS&C high school project described its scope, sequence and coordination as follows;

Scope

The Scope of the SS&C program includes the subject matter of physics, chemistry, biology and the earth and space sciences for grades 9-12. It also includes practical applications of the basic science concepts, principles, and laws of those sciences. For those personal, societal, or global problems or issues, their scientific components, taken as applications of science, fall within the scope of SS&C.

Sequence

The SS&C project emphasizes appropriate sequencing of learning, taking into account the students' prior knowledge and preferred mode of learning. SS&C students encounter concepts, principles, and laws of science at successively higher levels of abstraction over several years, making it possible for them to learn and understand science in greater depth.

An SS&C curriculum includes the practical application of science focusing first on problems and issues of concern to students and then focusing on more global considerations. Gradually putting science into a larger context helps students relate science to their lives.

Coordination

The physical sciences, life sciences, and earth and space sciences share topics and processes. Coordination among the science disciplines leads students to an awareness of the interdependence of the sciences and their

*Laboratory of Science Education, Faculty of Education, Shimane University, Matsue, Japan

place in the larger body of human knowledge.

The SS&C program provided science in four science subjects each year for all students at the high school level. The project materials and pedagogy adhered to two fundamental sets of criteria: the ten tenets of SS&C and the *National Science Education Standards* (*NSES*). The ten basic tenets of SS&C were as follows;

1. To provide science learning in four subject areas each year: biology, chemistry, physics, and the earth /space sciences;
2. To explicitly take into account students' prior knowledge and experience, as expressed in their preconceptions and metaphors;
3. To provide a sequence of content, and the learning of it, from concrete experience and descriptive expression to abstract symbolism and quantitative expression;
4. To provide concrete experience with science phenomena before the use of terminology that describes or represents those phenomena;
5. To revisit concepts, principles, and theories at successively higher levels of abstraction;
6. To coordinate the four science subjects so as to interrelate basic concepts and principles;
7. To utilize the short-term motivational power of relevance by connecting the science learned to subject areas outside of science (such as history, art, and music), to the practical applications of technology and to the challenge of solving those personal and societal problems that have relevant underlying scientific components;
8. To utilize the long-term motivational power of sudden and profound understandings of science and of the awe which stems from comprehension of the power and universality of a relatively small number of fundamental principles of science;
9. To greatly reduce topical coverage, with an increased emphasis on greater depth of understanding of those fewer fundamental topics;
10. To create assessment methods, items, and instruments to measure student skills, knowledge, understandings, and attitudes, both for program evaluation and the requirement of assigning grades, which are fully consistent with tenets 1-9.

A principal purpose of SS&C high school project was to establish through evidence in the form of valid measures of student achievement, that a program based on SS&C tenets would better enable a representative sample of high school students to achieve the NSES than would traditional instruction with the layer-cake curriculum of one year of biology (which 80% study), one year of chemistry (40%). and one year of physics (20%). In this project, NSTA had developed materials, provided teacher enhancement, conducted both summative and formative evaluations, and carried out a trial implementation of the SS&C program for high school science in grade 9-10 until 1997. The materials called *micro-units* had the student version and the teacher version, which provide them readings, laboratory activities suggested sequences, and assessment tools. Students participating in this project and using SS&C materials had been drawn from 15 pilot high schools during 1995-1996 school year. These high schools had diverse geography, populations and resources, representative of the nation's high schools.

Implementation of the 9th Grade SS&C Curriculum in Two Schools

In 1995-96 school year, North Carolina SS&C high school project began its first year. The 9th grade SS&C curriculum was implemented in two pilot schools. Before implementing, teachers from two schools attended a three-week intensive SS&C Summer Institute. During the intense institute, they wrote and re-wrote the curriculum, field-tested laboratories, and discussed the entire 9th grade Scope, Sequence, and Coordination.

The 9th grade SS&C course was implemented in Tarboro H. S. and Northside H. S. during one semester (90

days). There were 5 classes a day in each school. Each class had 90 minutes. At Tarboro H. S., all 9th graders were enrolled in SS&C course. This was the only 9th grade science course offered. The SS&C course was taken by 135 students and taught by 4 teachers. At Northside H. S., 2 science courses were offered for 9th graders. They were SS&C and Honors Physical Science. Students were encouraged by teachers to pre-register for the innovative science courses. The SS&C course was taken by 130 students and taught by 4 teachers.

The SS&C teacher taught as many of the priority topics as possible within the time span of the course. Some mid priority topics were also selected. Laboratory activities are performed daily, with structured student journaling as the primary mode of recording student's participation and process. Cooperative learning was used throughout the activity of the course. Students were sometimes encouraged to use their journals and discussion to come to answers. Daily grades are given from teacher observations during the activity. Assessments were given as needed, either in written form or in performance activities. They were not structured as traditional "tests", but were instead usually given in single, double, or small groups of items. Creative expression was also taken into account as some methods of data recording; student learning was presented in project form, such as informational brochures, presentations, and posters.

Ⅱ. Purpose

The purpose of this survey study was to investigate what four groups (population: students, teachers, parents, and administrators) feel about the effectiveness, enjoyment, and any problems they see with SS&C at the end of implementation of the 9th grade SS&C course. And the four groups' responses for every questionnaire item would be compared in order to find out the similarities and differences of their thinking tendency. The focuses of this survey were as follows;

1. Education: What do they think toward school and science education?
2. Communication: Do they have enough time to talk about the SS&C course each other?
3. Student: How do they evaluate student's learning in the SS&C course?
4. Teacher: How do they evaluate SS&C teacher's teaching in the SS&C course?
5. Lesson: How do they evaluate the SS&C course and the SS&C curriculum?

Ⅲ. Method

This survey used a descriptive (paper-pencil) method. There were four different questionnaires (for student, parent, teacher, and administrator). The questionnaire items were made for each population in order to correspond to the above-mentioned 5 focuses. Each questionnaire item asked the answerer to respond their opinions by using the five scale method and their reasons. The survey framework of these four questionnaires and the sample survey form are shown in appendix A.

This survey was carried out in January 1996. On the ast week of the semester implemented the SS&C course, the questionnaires were distributed for four populations at both schools and gathered.

All responses except reasons were transformed into numerical value and typed in the electronic files in order to be used in statistic analysis. SAS statistic package was used for statistic analysis in this survey. Some of the result tables of statistic analysis would be shown in appendix B.

Ⅳ. Result

A. The Background of Four Studied Groups

Students

This group consisted of 167 high school students; 99 of them were enrolled at Northside H. S. and 68 at Tarboro H. S.. There were 89 male students and 74 female students (4 students had lack of data), and 86 White Americans, 75 African Americans, and 1 other race (5 students had lack of data). The 14 to 16 years old students

occupied 80 percent of this group.

Regarding students' gender and race, there was a significant difference between the two schools ($p<0.01$). In Northside H. S., male students occupied more than 60 percent of the studied population. 60 percent of students were White Americans, and 35 percent African Americans. In Tarboro H. S., female students occupied more than a half of the studied population. 60 percent of students were African Americans, and 35 percent White Americans.

Parents

This group consisted of 84 persons, 63 of them were from Northside H. S. and 21 from Tarboro H. S.. There were 70 women and 11 men (3 persons had lack of data). 37 persons had a male child and 41 persons a female child, 28 persons had an African American child and 50 persons a White American child (6 persons had lack of data). 80 percent of parents had 1 to 3 children, and 3 to 5 family members.

Regarding their child's gender and race, there was a significant difference between the two schools ($p<0.01$). In Northside H. S., 33 persons (52%) had male children and 25 persons (40%) had female children, and 16 persons (25%) had African American children and 42 persons (67%) had White American children (5 persons had lack of data). In Tarboro H. S., 4 persons (19%) had male children and 16 persons (76%) had female children, and 12 persons (57%) had African American children and 8 persons (38%) had White American children (1 person had lack of data).

Teachers

This group consisted of 7 teachers, 3 of them were from Northside H. S. and 4 from Tarboro H. S.. There were 3 men and 4 women, and 3 African Americans and 4 White Americans. 4 of them had less than 10 years of teaching experience, and the rest more than 10 years.

Regarding the teacher's gender, race, and teaching experience, the characteristic of each school was quite different. The teachers of Northside H. S. were all female African Americans. Their teaching experience was more than or equal to 13 years. The teachers of Tarboro H. S. were all White Americans, 3 were male and 1 female. Their teaching experience was less than or equal to 6 years.

Administrators

This group had 2 administrators. The administrator of Northside H. S. was male and Tarboro H. S. female. They were White Americans. They had about 10 years of teaching experience, and more than 10 years of administration experience. The administrator of Northside H. S. had slightly more teaching and administrative experience.

B. The Characteristics of Each Group's Responses

1. Students

- About 70 percent of students liked their school and science.
- More than a half of the students did not talk about the SS&C science course with their parents (57%), and with their teachers (75%).
- More than 60 percent of students thought they enjoyed the SS&C course, they learned more this year than in the past, and this course helped them to understand science. About 70 percent of students answered that they did more different science activities than they used to do, and that they felt it easy to do the course activities. Students emphasized learning and doing activities more this year when compared to past years.
- Students tended to think that their science teacher seemed to enjoy teaching (70%) and taught more understandably than other teachers who had taught in the past (60%).
- Sixty five percent of students liked what they were studying in the SS&C course. More than a half of the students thought the SS&C was suitable for their needs (57%),the content of this course was better than the science that they used to study (54%), the amount of topics of this ourse was suitable for them (57%), and the lesson time of this course was enough for them to study (55%). Only 20 percent of students answered their

burden increased in this course.

** School Difference*

There was a significant school difference in 3 questionnaire responses. The items from the questionnaires were as follows:

Q1 : Do you like your School? (P<0.01)

Q4 : Do you often talk with the teachers about the SS&C course? (P<0.05)

Q6 : Does your science teacher seem to enjoy teaching? (P<0.01)

In each item, the students of Northside H. S. showed more affirmative answers than the students of Tarboro H. S..

** Gender Difference*

There was a significant gender difference in 1 questionnaire response. The item from the questionnaire was as follows:

Q9 : Do you think the SS&C course helps you to understand science? (p<0.05)

Female students think the SS&C course helps to understand science more than male students.

** Race Difference*

There was a significant difference between African Americans and White Americans in 2 questionnaire responses. The items from the questionnaires were as follows:

Q1 : Do you like your school? (p<0.05)

Q11: Do you feel it difficult to do the SS&C course activities? (p<0.05)

White American students like their school more than African American students. African American students feel it more difficult to do the SS&C activity than White American students.

2. Parents

- Most parents were strongly interested in the school and in science education that their children were studying. They thought the school made much effort to suit their children's needs (81%).

- Almost all parents had not heard that their child was enrolled in the SS&C course this school year. 64 percent of parents thought their child tended to talk about this course, but half of them thought the teachers did not inform them about it.

- About 60 percent of parents thought that their child seemed to enjoy and to learn more science this year, that the SS&C course helps their child to understand science, and that their child seemed not to feel it difficult to do science homework this year. Moreover, 40 percent of parents thought that their child seemed to do more activities than he or she used to do at home.

- More than half of the parents liked the SS&C course, and thought the SS&C course was suitable for their children's needs. More than 65 percent of parents thought their educational cost and burden, which were related to their children's enrollment in the SS&C course, did not increase.

- As a result of the statistical analysis of parents' answers, there was no significant school difference.

3. Teachers

- The teachers thought that they often talked with students, parents and administrators about the SS&C course.

- Almost all teachers thought that the students seemed to enjoy studying the SS&C course, the students learned more science and did more and different activities than in the past, the students did not feel it difficult to do the course activities, and this course helped students to understand science.

- Most teachers thought that they enjoyed teaching the SS&C course, they taught more understandably than in the past, there were not enough materials and equipment for this course in their school, the cooperation of parents and administrator was enough to teach this course, it was difficult to prepare the course lessons, and it

was not difficult to assess students' ability in this course. More than half of the teachers thought it was not difficult to manage the course lessons.

- Almost all teachers thought that they liked the SS&C course, this course was suitable for students' needs, the content of this course was better than the science that they used to teach, and the cost for science class increased. Teachers tended to think that the amount of topics of this course was suitable for students, the lesson time of this course was enough for students to study, and that their burden increased to operate this course.

** Comparing the data from two schools*

Northside H. S. teachers thought more strongly that they talked with the administrator and parents about the SS&C course and their cooperation was enough to teach, students did more different activities and felt it easy to do them, and it was not difficult to assess students' ability in this course. They also thought strongly that they liked this course, this course was suitable for students' needs, and the content of this course was better. They thought more seriously that there were not enough materials and equipment for this course and the lesson time of this course was not enough for them to study.

Tarboro H. S. teachers thought more strongly that they talked with students about the SS&C course, students learned more science this year, the amount of topics of this course was suitable for students, they taught more understandably this year than in the past. They thought more seriously that it was difficult to prepare the course lessons.

4. Administrators

- Both administrators were interested in science education. The Northside H. S. administrator often observed the SS&C course, and the Tarboro H. S. administrator often talked with the teachers and students about this course.

- Both administrators thought that the teachers and students seemed to enjoy teaching and learned more in the SS&C course, and that there are enough materials and equipment for this course in their school. The Tarboro H. S. administrator thought that students learned more science and the SS&C teachers taught more understandably.

- Both administrators thought that they liked the SS&C course, this course was suitable for students' needs, the content of this course was better than the science the teachers used to teach, and the cost for their school's science education and their burden did not increase to operate this course. The Northside H. S. administrator thought that the lesson time of this course was enough for students to study. The Tarboro H. S. administrator thought that the teachers did not have enough time to prepare for their class, the amount of topics of this course was suitable for students, and that this course helped students to understand science.

C. The Difference in the Group Average Answers among Four Groups

[Education]: In spite of their parents' and administrators' high interest, students were less interested about the school or science education.

[Communication]: Students thought they did not often talk about the SS&C course with others, but the others more positively thought that they often talked with students about it. The administrators slightly accepted the teachers' thought that they often talked with the parents and administrator about this course, but parents slightly disagreed.

[Student]: Students themselves did not think as much as the others that they enjoyed studying the SS&C course. All groups thought similarly that students learned more science and did not feel it difficult to do the SS&C activities. The teachers thought more strongly than the others that this course helped students to understand science. The teachers thought more positively than students that students did more activities, but parents slightly thought that their child did more activities at home.

[Teacher]: The teachers thought more strongly than the others that they enjoyed teaching this year. And they thought more positively than students that they taught more understandably this year. The administrators tended to think more positively than the teachers themselves that the SS&C teachers taught more understandably than in the past. As regarding the materials and equipment for the SS&C course, the teachers thought they did not have enough, but the administrators showed opposite opinion.

[Lesson]: The teachers liked the SS&C course more than the others. The teachers and administrators thought more strongly than students and parents that this course was suitable for students' needs. The administrators thought more strongly than the teachers and students that this course had suitable contents and amount of topics. All groups similarly thought that the lesson time of this course was enough for students. The teachers thought that their burden and cost increased to operate this course, but the others did not mention about the increase of their burden and cost. The teachers thought more strongly than the administrators that their preparation time for this course was not enough.

** Comparing the Data from Two Schools*

As compared with Northside H. S., Tarboro H. S. showed opposite characters in the following points. Tarboro H. S. had a large gap between students' average answer and the teachers' and administrators' average answers with regard to the communication between them. The Tarboro H. S. administrator thought more positively than the teachers with regard to the communication between them. The Tarboro H. S. teachers and administrator thought more strongly than students and parents that students learned more this year, the SS&C course helped students to understand science, and students felt it difficult to do the SS&C activities. They thought more positively than students that the teachers taught more understandably this year and that the amount of topics of the SS&C course was suitable for students. The Tarboro H. S. administrator thought more strongly that the teachers did not have enough preparation time for this course.

D. The Character of Each Group's Reason Description

1. Students

According to the students' reason descriptions, students generally had the following thoughts toward the SS&C course.

* *positive thoughts*

- doing more hands-on activities (experiments)
- understanding more, learning more
- teaching more, making clear, explaining more, taking time
- learning new (different) thing, more advanced
- things needed to learn
- like coordination
- fun, interesting
- easy

* *negative thoughts*

- dissatisfaction at the coordinated science
- little explanation of the teacher, little understanding
- too much contents, too much work, hard
- trying to rush (not enough time)
- if missed, it's hard to make up
- no materials
- too easy, like a review
- not interesting, not fun

- the same as the science course in the past

While attending the SS&C course, they thought they learned about many different things which were needed for them; for example, chemical topics (acids and bases, glue, pH, etc.), biological topics (plants, animals, ecosystems, etc.), how things work, how to do experiments, and how to understand in the SS&C course.

55 students showed their comments toward the SS&C course. 32 students showed their positive feelings for the contents, experiments, and lessons of the SS&C course. 23 students described negative comments; for example, necessity of instruction, too much work and assessment (writing, reading, summarizing), difficult, and dislike.

2. Parents

According to the parents' reason descriptions, parents generally had the following thoughts toward the SS&C course.

** positive thoughts*

- doing more hands-on activities (experiments), writings, readings
- talking more about the science lessons
- helping them to learn science
- look enjoying, interesting
- easy

** negative thoughts*

- do not explain, do not care
- too much work, much subject (coordinate)
- do not work
- poorer than the past science course, drop grades
- do not see homework
- do not look enjoying, interesting
- do not inform about the SS&C course

3. Teachers

According to the teachers' reason descriptions, teachers generally had the following thoughts toward the SS&C course.

** positive thoughts*

- effectiveness of doing hands-on activities every day (experiments)
- effectiveness of coordination (enjoying at least one or two areas, awareness of interconnectedness)
- effectiveness of cooperative group activities
- Making students' greater motivation and active attitude
- development of analytical manipulative skills
- effectiveness of studying everyday life phenomena
- effectiveness of student-centered teaching

** negative thoughts*

- take much time for teacher's preparation (2.5 hour everyday / until 5:00 pm)
- shortage of materials and equipment (need to purchase, borrow, collect)
- need more teacher's advanced preparations of labs and readings
- missing teacher's invention
- shortage of the money for materials and equipment
- difficulty of activity assessment (students were unfamiliar with the instruments)
- some inappropriate labs, readings, and assessments

- need teacher's expanded expertise on wider discipline

Teachers described their comments about what they learned while the SS&C course as follows;

- many concepts and skills needed to teach
- science can be a lot of fun for students
- student's strange perceptions of the events
- creative ways of doing
- how to incorporate hands-on learning with lecture and cooperative learning
- authentic learning

4. Administrators

According to the administrators' reason descriptions, administrators generally had the positive thoughts toward the SS&C course. They mentioned about the effectiveness of hands-on activities, real world situations (practical setting), and diversity of the curriculum.

V. Conclusion

From the analysis of this survey, it was found that more than half of the students showed the enjoyment and suitability of taking the 9th grade SS&C course. They were interested in the hands-on activities which were from wide range of science subjects and helped them to understand science. It was also found that most of all parents, teachers, and administrators showed the SS&C course to be effective. They mentioned that the SS&C course made science fun for students and developed their understandings. The North Carolina SS&C high school project was considered successful in this regard.

However, four groups saw some problems during implementation of the 9th grade SS&C course. Students were unfamiliar with this type of instruction and assessment, so some of them, who liked the traditional lecture and textbook type instruction, showed negative opinions. Parents expressed dissatisfaction with the lack of communication with teachers about the SS&C course. Teachers commented on the increase of their physical time and financial burden for the implementation of the SS&C course.

Note

本稿は、アメリカ合衆国ノースカロライナ州のイーストカロライナ大学において1995－1996**年当時教育学部長であったチャールズ・コブル氏のもとで従事した、**NC SS&C **高校理科カリキュラム開発プロジェクトにおける事後評価研究での調査データをもとにして執筆したものである。**

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Appendix A

Survey Framework

Content of Each Item	Item Number on Each Survey Form			
	Students	Parents	Teachers	Administ.
[Background]				
・Gender	●	●	●	●
・Age	●			
・Race	●		●	●
・Relation with student		●		
・The Number of Children		●		
・The Number of Family Members		●		
・The Number of Teaching Years			●	●
・The Number of Administering Years				●
[Education: school and science]				
E1: Interest for school / like school	1	1		
E2: Interest for science education / like science	2	2		1
E3: School's suitability for student's needs		3		
[Communication: Talk about the SS&C course]				
C1: Hear about / Observe the SS&C course		4		2
C2: Talk between student and parent	4	6		
C3: Talk between student & teacher / adminis.	3		2	4
C4: Talk between teacher & parent / administ.		5	3	3
[Student: Learning the SS&C science]				
S1: Enjoy learning	5	9	5	5
S2: Learn science more than in the past	7	7	8	7
S3: The SS&C helps to understand science	9	10	10	9
S4: Feel difficulty in learning	11	8	11	
S5: Do more different activities	12	11	12	
S6: What students learn from the SS&C	18			
[Teacher: Teaching the SS&C science]				
T1: Enjoy teaching	6		4	6
T2: Teach more understandably this year	10		6	8
T3: Teach more understandably than others			7	10
T4: Not enough materials and equipment			21	17
T5: Not enough cooperation of parent / administ.			9	
T6: Feel difficult to prepare the lesson			13	
T7: Feel difficult to manage the lesson			14	
T8: Feel difficult to assess students' ability			15	
T9: What teachers learn from the SS&C			24	
[Lesson: The SS&C science course]				
L1: Like the SS&C course	8	15	1	11
L2: Suitable for students' needs	17	12	16	12
L3: Suitable contents	13		17	13
L4: Suitable amount of topics	14		18	14
L5: Not enough lesson time	15		20	16
L6: Increase the burden to operate / attend	16	14	23	19
L7: Increase the cost to operate / attend		13	22	18
L8: Enough preparation time			19	15
[Free Description]				
・Comments about the SS&C Science Course	19	16	25	20

Appendix A (Cont.)

Sample Survey Form (Extraction from Students' Questionnaire)

No.

NC SS&C survey form for Student

This is not a test. Please try to respond by stating what you really think.

Please check the appropriate response or write your answer in each blank.

* What is your gender? ☐ Male ☐ Female
* How old will you be next May? ( ) years old
* What is your race? ☐ African American ☐ Asian American ☐ White American ☐ Other ( )

Please check the most appropriate response and write your comment to each question.

Check box DY : Definitely Yes
Check box PY : Probably Yes
Check box DK : Don't Know
Check box PN : Probably Not
Check box DN : Definitely No

	DN	PN	DK	PY	DY
1. Do you like your school?	☐	☐	☐	☐	☐
2. Do you like science?	☐	☐	☐	☐	☐
3. Do you often talk with the teachers about the new 9th grade science course?	☐	☐	☐	☐	☐
4. Do you often talk with your parents about the new 9th grade science?	☐	☐	☐	☐	☐
5. Do you enjoy studying the new 9th grade science course?	☐	☐	☐	☐	☐
6. Does your science teacher seem to enjoy teaching?	☐	☐	☐	☐	☐
7. Do you think you are learning more science this year than in the past?	☐	☐	☐	☐	☐
8. Do you like what you are studying in the new 9th grade science course?	☐	☐	☐	☐	☐

* Please explain why you think so.

( )

9. Do you think the new 9th grade science course helps you to understand science? ☐ ☐ ☐ ☐ ☐

* Please explain why you think so.

( )

Appendix B

Result : Four Groups' Means of Answer

NOTES: "Means were calculated after giving numerical values for each answer as follows:
Definitely Not=1, Probably Not=2, Don't Know=3, Probably Yes=4, Definitely Yes=5

(E1 - E3) Education : School and Science

		Students		Parents		Administ.	
E1:(St) Like school	All	Q1	3.5	Q1	4.8		
(Pa) Interest for school	Northside		3.8		4.9		
	Tarboro		3.1		4.8		
E2:(St) Like science	All	Q2	3.8	Q2	4.7	Q1	4.5
(Pa,Ad) Interest for science education	Northside		3.5		4.7		4.0
	Tarboro		3.7		4.7		5.0
E3:School's suitability for student's need	All			Q3	4.0		
	Northside				4.1		
	Tarboro				3.5		

(C1 - C4) Communication : Talk about the SS&C Course

		Student		Parents		Teachers		Administ.	
C1:(Pa) Hear about the SS&C Science	All			Q4	1.8			Q 2	3.0
(Ad) Observe the SS&C Science Lesson	Northside				1.9				4.0
	Tarboro				1.8				2.0
C2:Talk between student and parent	All	Q4	2.5	Q6	3.5				
	Northside		2.9		3.6				
	Tarboro		2.3		3.2				
C3:Talk between student and teacher / administrator	All	Q5	1.9			Q2	4.1	Q 4	3.0
	Northside		2.3				3.3		2.0
	Tarboro		1.9				4.8		4.0
C4:Talk between teacher and parent / administrator	All			Q5	2.7	Q 3	4.1	Q 3	3.5
	Northside				2.6		4.3		2.0
	Tarboro				3.1		4.0		5.0

(S1 - S8) Student : Learning the SS&C Science

		Students		Parents		Teachers		Administ.	
S1:Enjoy learning	All	Q 5	3.4	Q9	3.6	Q5	4.3	Q5	4.3
	Northside		3.5		3.6		4.3		4.0
	Tarboro		3.2		3.6		4.3		4.3
S2:Learn science more than in the past	All	Q 7	3.3	Q7	3.7	Q6	3.7	Q7	4.3
	Northside		4.0		3.8		3.3		3.3
	Tarboro		3.5		3.3		4.3		5.3
S3:The SS&C course helps to understand Science	All	Q 9	3.7	Q10	3.7	Q10	4.3	Q9	3.5
	Northside		3.8		3.8		4.3		3.3
	Tarboro		3.6		3.5		4.3		4.3
S4:Feel difficulty in learning	All	Q1	2.2	Q8	2.5	Q11	2.1		
	Northside		2.3		2.6		1.7		
	Tarboro		2.0		2.1		2.5		
S5:Do more different activities	All	Q12	4.1	Q11	3.2	Q12	4.6		
	Northside		4.3		3.3		5.0		
	Tarboro		3.9		2.9		4.3		
S6:What students learn from the SS&C	All	Q13	-						
	Northside		-						
	Tarboro		-						

Appendix B (Cont.)

(T1 - T9) Teacher : Teaching the SS&C Science

		Students	Teachers	Admirist.
T1:Enjoy teaching	All	Q6 4.0	Q4 4.3	Q5 4.0
	Northside	4.2	4.6	4.0
	Tarboro	3.6	4.3	4.0
T2:Teach more understandably this year	All	Q10 3.5	Q6 2.8	Q8 4.0
	Northside	3.5	3.0	3.0
	Tarboro	3.5	4.3	5.0
T3:Teach more understandably than others	All		Q7 2.2	Q10 3.5
	Northside		2.6	3.0
	Tarboro		3.5	4.0
T4:Not enough materials and equipment	All		Q21 4.1	Q17 2.0
	Northside		4.7	2.0
	Tarboro		3.8	2.0
T5:Not enough cooperation of parent / administrator	All		Q9 2.1	
	Northside		2.0	
	Tarboro		2.3	
T6:Feel difficult to prepare the lesson	All		Q15 2.4	
	Northside		3.3	
	Tarboro		1.8	
T7:Feel difficult to manage the lesson	All		Q14 2.7	
	Northside		2.7	
	Tarboro		2.8	
T8:Feel difficult to assess students ability	All		Q16 2.0	
	Northside		1.3	
	Tarboro		2.5	
T9:What teachers learn from the SS&C	All		Q24 -	
	Northside		-	
	Tarboro		-	

(L1 - L8) Lesson : The SS&C Science Course

		Students	Parents	Teachers	Admirist.
L1:Like the SS&C course	All	Q8 3.6	Q16 3.8	Q1 4.6	Q7 4.0
	Northside	3.7	3.9	4.7	4.0
	Tarboro	3.4	3.8	4.5	4.0
L2:Suitable for students' needs	All	Q17 3.6	Q12 3.5	Q16 4.6	Q12 4.5
	Northside	3.7	3.3	4.7	4.0
	Tarboro	3.5	3.7	4.5	5.0
L3:Suitable contents	All	Q13 3.5		Q17 3.9	Q12 5.0
	Northside	3.5		4.0	5.0
	Tarboro	3.4		3.8	5.0
L4:Suitable amount of books	All	Q14 3.5		Q18 3.4	Q14 3.0
	Northside	3.6		3.0	3.0
	Tarboro	3.4		3.8	5.0
L5:Not enough lesson time	All	Q15 2.5		Q20 2.5	Q16 2.5
	Northside	2.5		3.3	2.0
	Tarboro	2.5		2.3	3.0
L6:(St,Pa) Increase the burden to attend (Te,Ad)Increase the burden to operate	All	Q16 2.7	Q14 2.9	Q23 4.2	Q19 2.0
	Northside	2.8	2.9	5.0	2.0
	Tarboro	2.5	2.8	4.0	2.0
L7:(Pa) Increase the cost to attend (Te,Ad) Increase the cost to operate	All		Q13 2.9	Q22 4.4	Q18 2.0
	Northside		2.9	5.0	2.0
	Tarboro		2.7	4.0	2.0
L8:Enough preparation time	All			Q19 2.5	Q15 3.0
	Northside			2.5	4.0
	Tarboro			2.5	2.0