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ABSTRACT

This collection of research instruments, together with a user's guide, is a supplement to the final report of the Salish I Research Project. The Salish I Research Project was an exploratory study conducted by a national collaborative to uncover knowledge about the relationships between secondary science and mathematics teacher preparation, new teacher knowledge, beliefs, performance, and student learning outcomes. This package provides instruments to document the change process as institutions alter their teacher education programs by building on findings from the Salish I Research Project. Included are procedural recommendations, questionnaires, interview protocols, and coding schemes that can be used to study a beginning teacher for a school year or over a series of years. (MM)

SALISH

A Research Project Dedicated
to Improving Science and
Mathematics Teacher Education

Secondary Science and Mathematics Teacher Preparation Programs:

Influences on New Teachers and Their Students

Instrument Package & User's Guide

A Supplement to the Final Report of the Salish I Research Project

June 1997

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Table of Contents

GENERAL INTRODUCTORY INFORMATION

Purpose of this Package

This package[1] provides instruments to document the change process as institutions alter their teacher education programs by building on findings from the Salish Research Project I. Included are procedural recommendations, questionnaires, interview protocols, and coding schemes that can be used to study a beginning teacher for a school year or over a series of years. A coding scheme accompanies each of the interview protocols. The nature of the coding schemes and the original questions in the protocols were influenced by the beliefs of the research team regarding ways to prepare teachers to meet emerging national and state standards. Codes emerged from data in the Salish Research Project 1. Each coding scheme was grounded in data obtained from the specific interview protocol. You may want consider these and/or develop your own. This document also provides suggestions to guide the work of researchers new to the instruments used in Salish Research Project I.

Background of Recommendations

The recommendations herein derive from the successes and pitfalls the Salish team encountered as the project's design and procedures emerged, were tested, and were modified. Each research site submitted quarterly reports, that included among other items, identifying problems various sites were encountering during the course of the Salish Research Project I, and options devised to mitigate the problems. A review of these reports was conducted, followed by telephone queries to various team members for clarification , extension, confirmation, or negation, to help users of this instrument package learn from the team's experiences. The review revealed six areas of concern: (a) obtaining permission to conduct the research, (b) resources needed by an institution to conduct the research, (c) preparing interviewers, (d) logistics for data collection, (e) being realistic when choosing instruments, and (f) being realistic about the time needed for data analysis. Each of these is discussed below with recommendations to consider when planning a study using this instrument package.

It is assumed that some people who help with documenting change may not have experience with qualitative research. They may need some orientation to this genre. In addition to the information herein, there following books provide guidance for doing qualitative research:

Bogdan, R.C. and Biklen, S.K. (1992). *Qualitative research for education: An introduction to theory and methods.* Boston. Allyln and Bacon Inc.

Denzin, N.K. & Lincoln, Y.S. (1994). *Handbook of qualitative research.* Newbury Park, CA. Sage Publications

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[1]A version of this package was originally compiled by Judy Vopava and several other Salish I research associates for use in the Salish I research project. Revisons were made in this version to make the Salish I instruments useful for others interested in using it. These revisions were made by Barbara S. Spector and Thomas LaPorta.

Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis (2nd ed.)* . Newbury Park, CA. Sage Publications.

Patton, M.Q. (1990*). Qualitative evaluation and research methods.* Newbury Park, CA. Sage Publications

The findings from the review of the Quarterly Reports follow:

I. Obtaining Permission to Conduct the Research

Obtain formal permission from both the university and the schools employing the teachers being studied. Schools may require formal written permission from the students, the teacher, the principal, the district's research office and, or, the district's evaluation department. Obtaining permission from students usually requires a signature from a parent or guardian. The wording on the permission letter should be as limited as the school will accept in order to avoid inadvertently including words that serve as red flags to parents and discourage a parent from signing the permission letter, (e.g., the word risk).

Most higher education institutions have an internal review board (IRB) in place with specific procedures to follow and forms to complete to obtain permission to do research on human subjects. Getting permission from a university's IRB to conduct the research may be more time consuming than one would anticipate. Allow more time than you think should be needed. It took more than a year for some universities participating in the Salish Research Project I to get approval.

II. Resources Needed by an Institution to Conduct the Research

Here are some thoughts to assist you in estimating the type of and quantity of computer and human resources needed to conduct a study with this instrument package. These emerged from using the instruments for a multi-institutional, cross-site study.

<u>1. Technological Resources</u>

The computer played a major role in the Salish Research Project I. Researchers used the HyperResearch program to assist in handling, organizing, coding, and analyzing all interview data. There are other programs available on the market that can serve the same function. These computer programs simplify some of the steps delineated in this guide and provide other options for manipulating the data. Select software that is compatible across platforms, especially for conducting cross-site research. Common software (e.g., word processing, spread sheet). is also suggested even when working on identical platforms. Access to e-mail and software for downloading and translating e-mail attachments are important.

Audio and video taping equipment are necessary. A telephone microphone is needed if telephone interviews are conducted. Transcribing audiotaped interviews requires a good transcribing machine. When video taping, the quality of the audio track on the video taped data can be a problem. A clip-on wireless microphone for the teacher and stationary microphone on the video camera can be mixed together to obtain superior quality data (more detailed suggestions for taping are included in the standard operating procedures for video/observational data in this package) .

To speed up analysis of questionnaire data, the questionnaires can be turned into a Scantron form.

2. Human Resources

Decisions about personnel needed to complete the study depend on how many new teachers will be involved in the study and for how long. Research associates who are familiar with qualitative research are needed. The study can be greatly enhanced by engaging research associates and clerical staff for the life of the study. This should miminize turnover. Doctoral students early in their programs may be desirable as research associates. They help recruit teachers for the study and develop a rapport with the new teachers that lasts throughout the study. The quality of that rapport can be critical to retaining a new teacher in the study. The trusting relationships developed can enrich the quality of data obtained in interviews. It can contribute to meaning making when research associates analyze and code data, write summary paragraphs, and develop and test assertions.

Major clerical tasks include transcribing tapes, data entry, and assembling instruments for mailing and reports. The administrative schedule that follows was suggested for collection of year three data. It provides insight to variations in workload for personnel on the project and when additional help may be needed.

ADMINISTRATION SCHEDULE

The following schedule, based on the months in the school year, was recommended for the administration of Salish I measures in year 3 of the study. Users of this package may want to adopt this schedule for administering the measures. Because videotaping and interviewing 20 NTs will take several months, it is understood that administering these measures may require more time than what is allotted to them. If the classroom being measured is a one-semester rather than a full-year class, the student measures should be spread throughout the semester, with pre-test measures administered early and post-test measures late in the semester. Similar adjustments in the administration schedule should be considered when dealing with classes taught on a block or other form of alternative scheduling system.

A. First Month

New Teachers
SIDESTEP
Part I[2]
Part II
Students
Student Information Sheet
The Nature and Implications of Science/Mathematics[3]

[2]Administer only to those NTs who have not previously completed this instrument.
[3]NISM should be administrated as close to the beginning of the school year as possible.

B. Second Month

Students
GOALS

C. Third/Fourth Months

New Teachers
Teachers' Pedagogical Philosophy Interview[4]

D. Fifth Through Seventh Months

New Teachers
Video Portfolio/Classroom Observation
Constructivist Learning Environment Survey[5]
The Nature and Implications of Science/Mathematics[5]
Teachers' Pedagogical Philosophy Interview[4]
Students
Student Questions
Constructivist Learning Environment Survey[5]

E. Eighth Month

Students
The Nature and Implications of Science/Mathematics[6]
GOALS[6]

F. Year-long Measures

New Teachers
Preservice Program Interview, New Teacher Form
New Teacher Transcript Summary
Secondary Administrators
SIDESTEP
  Part III
Program/Faculty
Preservice Program Interview, Mathematics/Science Faculty Form
Preservice Program Interview, Teacher Education Faculty Form

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[4]It is expected that it will take several months to interview 20 NTs; thus the TPPI is listed in more than one time period.
[5]To be completed close to the time that the classroom is videotaped.
[6]Ideally the post test measures will not be given too close to the final exam period.

Syllabus Analysis Form

III. Preparing Interviewers

The quality of the data from interviews is highly dependent on the skill of the interviewer, even though the interviews are structured. Probes for the program data interviews are included in the protocol. However, it is essential for each person conducting any interview to be thoroughly familiar with the coding scheme for that interview and have a comprehensive understanding of the study and how various pieces fit together. This knowledge sensitizes the interviewer to productive ways to redirect and probe. Interviewers should be careful to exclude questions relating to other agendas. Before interviewing respondents for the study, it is important to rehearse the questions and practice probing with colleagues. There is a need for researchers who collect data and those who code data to interact regularly.

IV. Logisitics for Data Collection

Teachers should be given a calendar indicating when instruments are to be administered and when the data must be returned. How many resources are to be allocated to delivery of instruments and collection of data depend on the location of the teachers and how reliable they are. Instruments may be hand delivered and picked up when completed. Insturment packages may also be mailed to teachers with prepaid mailing envelopes for the return of data. It is useful to telephone teachers to remind them to return data. Maintaining a balance between encouragement and nagging can be difficult.

Conducting telephone interviews may be necessary when teachers are located a substantial distance from the research associate. It is not very productive to give new teachers an interview protocol and ask them to respond in writing or by talking into a taped recorder.

V. Being Realistic When Choosing instruments

Decisions about the number of instruments, which instruments, when, and how to use them, must be made with regard to the realities of the world in which beginning teachers function. Inherent in research with beginning teachers are several barriers with potential to effect the conduct of a study. The following are samples of those noted by Salish research associates:

1. Time: Beginning teachers are commonly overwhelmed by job demands on their time. In addition to getting oriented to a school and their teaching responsibilities, teachers are frequently required to take responsibilillty for extra-curricular activities. They usually have minimal time management and organization skills that work in school settings. They often have mutiple preparations for courses. They frequently encounter limited access to equipment and materials requiring them to spend time scrounging.

2. Commitment: Gaining and maintaining support from school administrators, teachers and students is a major concern. In an attempt to encourage teachers to enter and stay with the reseach project inspite of their work load, several Salish sites used one or more of the strategies that follow: pay each teacher a modest honorarium, purchase books and curricula that a teacher

wants, researchers assist participants in administering student instruments and in other ways, arrange social events (e.g., local party, or homecoming weekend), and present with a researcher at professional associations' meetings. Presentation by a teacher of his/her individual experience in the study raises a question about compromising anonymity and confidentiality that should be promised to each participant at the outset of the study. Communiqués and newsletters were used to foster identification of teachers with the project. A newsletter that includes articles by, and about, teacher participants raises the issue of anonymity and confidentiality again. A long range view is important when deciding about these tradeoffs.

It is necessary to plan ways to encourage teachers to themselves respond to instruments on time, and to administer instruments to students on time. While teachers may be committed to the research enough to be willing to devote personal time to the project, it is common for them to be unwilling to "give up class time" to administer the instruments to students. In some cases teachers have to overlook their biases opposing standardized testing in general. Many, therefore, preferred to not administer the GOALS.

It is essential that teachers give students accurate directions and a create a tone that student participation is important. When students do not buy-in, the data obtained are not a true measure of learning. A common event was for students to race through a data collecting instrument with little thought to how they answered the questions. This failure to be serious about how they complete a research task raises questions about the usefulness of student data.

3. Confidence and Confidentiality

New teachers often lack confidence which influences the degree to which they act on what the know about teaching in their classrooms. They commonly ask researchers for feedback and recommendations for improvement. This could contaminate data. Other school personnel (e.g., a principal) may seek feedback from researchers that may violate a teacher's confidentiality and, or, contaminate the data.

4. Variety in School Schedules

The plan for administering data collection instruments needs to consider that many schools today are testing alternative schedules, such as block scheduling. Teachers sometimes make appointments with researchers that unanticipated changes in school schedules prevent them from keeping. Such events include fire drills, assemblies, pep rallies, district testing, or statewide testing. On occasion the teacher is absent from school and does not cancel the appointment. Appointments then need to be rescheduled which can play havoc with a researcher's plans.

VI. Being Realistic About the Time Needed for Data Analysis

Leave lots of flexibility in you work plan for data analysis. Analyzing data, coding the data, and writing summary paragraphs took significanly longer than Salish researchers ever imagined. A credible estimate of time is still difficult, because the process of devising the schemes and applying them were so integrated. We would only be guessing how long it would take a researcher, who is new to the schemes, to apply them.

During one of the Salish I meetings held in East Lansing, Michigan reseach associates discussed their estimates of the time needed to do a preliminary analysis of data. The following chart is the outcome of that discussion. It is an optimistic estimate, but is still useful to determine minimum time commitments needed to accomplish these tasks.

Task	Time
1. Transcribing interviews	6 hrs. per teacher
2. Coding faculty inteviews	3 hrs. per teacher
3. Coding NT program interviews	2 hrs. per teacher
4. Coding NT transcript	1 hr. per teacher
5. Coding TPPI interviews	4 hrs. per teacher
6. Doing STAM analysis of video data	6 hrs. per teacher

THE SALISH I INSTRUMENT PACKAGE

This measurement package includes the Level I new teacher (NT), student, and program measures that were used in Year Three of the Salish I Research Project (at the 1995 Salish Summer Meeting in Greeley, Colorado, these measures were revised slightly from those used in Year Two of the Research Project). Besides the revised versions of these instruments, this package contains scoring and coding schemes for these measures, and guidelines for preparing data for analysis. It also contains instructions for coding that were used in preparing Salish I data for analysis and final reporting. A more detailed explanation of these coding schemes and instructions for using them are included with each instrument.

All measures listed below are included in this package with the exception of GOALS which must be purchased separately from The Psychological Corporation; standard operating procedures for the administration of GOALS are included in this package.

LISTING OF MEASURES & RELATED DOCUMENTS

A. **New Teacher Measures**

1. Constructivist Learning Environment Survey (CLES) & scoring guidelines
2. The Nature and Implications of Science/Mathematics (NISM) & scoring guidelines
3. SIDESTEP (Salish Inventory for Demographic Evaluation of Schools and Teacher Education Programs) with a guidelines for coding used for entry into spreadsheet used by Salish I.
4. Teachers' Pedagogical Philosophy Interview (TPPI) with coding scheme and instructions for coding
5. Video Portfolio/Classroom Observation (including videotaping procedures, Secondary Teacher Analysis Matrix with instructions, and guidelines for writing video portfolio summaries)
6. Checklist for Teacher Measures
7. Instructions for creating a Teacher Data Matrix

B. **Student Measures**

1. Constructivist Learning Environment Survey & scoring guidelines
2. GOALS
3. The Nature and Implications of Science/Mathematics & scoring guidelines
4. Student Questions
5. Student Information Sheet

C. **Program Measures**

1. New Teacher Transcript Summary

2. Preservice Program Interview, New Teacher Form with codes and coding instructions

3. Preservice Program Interview, Mathematics/Science Faculty Form with codes and coding instructions

4. Preservice Program Interview, Teacher Education Faculty Form with codes and coding instructions

5. Syllabus Analysis Form

6. Program description form

7. Instructions for using the Program Data Matrix to write program summary paragraphs.

Salish I Research Project
Standard Operating Procedures
Teacher Measures

Shown below are the standard operating procedures for the Constructivist Learning Environment Survey, The Nature and Implication of Science/Mathematics, and the Checklist for Teacher Measures. Standard operating procedures for the other teacher measures can be found on the pages immediately preceding each of those measures. Scoring guidelines follow each measure. Instructions for summarizing a year of teacher data into a Teacher Data Matrix for use in analysis are at the end of this section.

Constructivist Learning Environment Survey

CLES should be completed by NTs close to the time that their classrooms are videotaped/observed, i.e., in the fifth through seventh months of the school year. It will take approximately 30 minutes to complete.

The Nature and Implications of Science/Mathematics

NISM should also be administered close to the time of videotaping/classroom observation. It will take approximately 15 minutes to complete.

Checklist for Teacher Measures

This measure includes a list of all the teacher measures. It may be used by the researcher and/or the NT to insure that all teacher measures are completed.

Teacher Data Matrix

This is completed as a means to summarize various teacher data regarding several teacher features.

Salish I Research Project
Constructivist Learning Environment Survey[7]
Mathematics Teacher Form

Date ______________________ Teacher Name __________________________

School ____________________ Course Title ___________________________

Directions: For each statement, fill in the circle that best describes your feelings about the class that was videotaped. Please consider each item carefully and answer every item.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
1.	Students learn about the world outside of school.	0	0	0	0	0
2.	Students learn that mathematics cannot provide perfect answers to problems.	0	0	0	0	0
3.	It's OK for students to ask "Why do we have to learn this?"	0	0	0	0	0
4.	Students help me to plan what they are going to learn.	0	0	0	0	0
5.	Students get the chance to talk to each other.	0	0	0	0	0
6.	Students look forward to the learning activities.	0	0	0	0	0
7.	New learning starts with problems about the world outside of school.	0	0	0	0	0
8.	Students learn how mathematics has changed over time.	0	0	0	0	0
9.	Students feel free to question the way they are being taught.	0	0	0	0	0
10.	Students help the teacher decide how well their learning is going.	0	0	0	0	0
11.	Students talk with each other about how to solve problems.	0	0	0	0	0
12.	The activities are among the most interesting at this school.	0	0	0	0	0

(continued)

[7]Adapted from *Constructivist Learning Environment Survey*, P. Taylor, B. Fraser, & L. White, Curtin University of Technology.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
13.	Students learn how mathematics can be a part of their out-of-school life.	0	0	0	0	0
14.	Students learn how the rules of mathematics were invented.	0	0	0	0	0
15.	It's OK for students to complain about activities that are confusing.	0	0	0	0	0
16.	Students have a say in deciding the rules for classroom discussion.	0	0	0	0	0
17.	Students try to make sense of each other's ideas.	0	0	0	0	0
18.	The activities make students interested in mathematics.	0	0	0	0	0
19.	Students get a better understanding of the world outside of school.	0	0	0	0	0
20.	Students learn about the different forms of mathematics used by people in other cultures.	0	0	0	0	0
21.	It's OK for students to complain about anything that stops them from learning.	0	0	0	0	0
22.	Students have a say in deciding how much time they spend on an activity.	0	0	0	0	0
23.	Students ask each other to explain their ideas.	0	0	0	0	0
24.	Students enjoy the learning activities.	0	0	0	0	0
25.	Students learn interesting things about the world outside of school.	0	0	0	0	0
26.	Students learn that mathematics is only <u>one</u> of many ways of understanding the world.	0	0	0	0	0
27.	Students are free to express their opinions.	0	0	0	0	0
28.	Students offer to explain their ideas to one another.	0	0	0	0	0
29.	Students feel confused.	0	0	0	0	0

(continued)

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
30.	What students learn has nothing to do with their out-of-school life.	0	0	0	0	0
31.	Students learn that today's mathematics is different from the mathematics of long ago.	0	0	0	0	0
32.	It's OK for students to speak up for each other's rights.	0	0	0	0	0
33.	Students have a say in deciding what will be on the test.	0	0	0	0	0
34.	Students explain their ideas to each other.	0	0	0	0	0
35.	The learning activities are a waste of time.	0	0	0	0	0
36.	Students have a say in deciding what activities they do.	0	0	0	0	0
37.	What students learn has nothing to do with the world outside of school.	0	0	0	0	0
38.	Students learn that mathematics is about inventing rules.	0	0	0	0	0
39.	Students feel unable to complain about anything.	0	0	0	0	0
40.	Students have a say in deciding <u>how</u> their learning is assessed.	0	0	0	0	0
41.	Students pay attention to each other's ideas.	0	0	0	0	0
42.	Students feel tense.	0	0	0	0	0

Salish Research Project
Constructivist Learning Environment Survey
Scoring Guidelines for the Mathematics Teacher Form, 1994-1995 Version

This instrument consists of both positive and negative statements which teachers must answer on a scale that ranges from "Almost Always" to "Almost Never." For **positive** item statements, the "Almost Always" choice would receive a 5 moving on down to the "Almost Never" choice which would receive a 1. For **negative** item statements, the numbering procedure is reversed.

Example:

		Almost Always	Often	Sometimes	Seldom	Almost Never
	In this class...					
(+)1.	students learn about the world outside of school.	0 5	X 4	0 3	0 2	0 1
(-)2.	what students learn has nothing to do with the world outside of school.	0 1	X 2	0 3	0 4	0 5

Sample item one would be scored as a 4 while sample item two would be scored as a 2. The total score would be 4 + 2 = 6, in this example.

I. PERSONAL RELEVANCE SCALE (PR)

This scale is concerned with students' experience of the personal relevance of school mathematics as perceived by teachers. The scale has been designed to measure the extent to which teachers feel that their students perceive the relevance of school mathematics to their out-of-school lives. From a constructivist perspective, the classroom environment should not promote a discontinuity between school mathematics and students' out-of-school lives by evoking an abstract and decontextualized image of mathematics. Rather, the classroom environment should engage students in opportunities:

(1) to experience the relevance of school mathematics to their everyday interests and activities;
(2) to use their everyday experiences as a meaningful context for the development of their formal mathematical knowledge.

Items:

1.	(+)	30.	(-)
7.	(+)	37.	(-)
13.	(+)		
19.	(+)		
25.	(+)		

II. MATHEMATICAL UNCERTAINTY SCALE (MU)

This scale is concerned with students' experience of mathematics as a fallible human activity as perceived by teachers. The scale has been designed to measure the extent to which teachers feel that their students perceive mathematics to be an uncertain and evolving activity embedded in a cultural context and that embodies human values and interests. From a constructivist perspective, the classroom environment should not promote the formalist myth of mathematics as a universal mono-cultural activity that is independent of human interests and values, or the Platonic myth of mathematical knowledge as static, independent of human experience, and providing an accurate and certain representation of objective reality (i.e., a correspondence theory of truth). Rather, the classroom environment should be concerned with engaging students in opportunities to learn:
(1) that mathematical knowledge is evolving and is inherently insecure;
(2) that mathematical knowledge is socially and culturally determined;
(3) that mathematical knowledge arises from human experience and values.

Items:

2. (+)
8. (+)
14. (+)
20. (+)
26. (+)
31. (+)
38. (+)

III. CRITICAL VOICE SCALE (CV)

This scale is concerned with students' development as autonomous learners. In particular, the scale has been designed to measure teachers' assessment of students' perceptions of the extent to which they are able to exercise legitimately a *critical voice* about the quality of their learning activities. From a constructivist perspective, the classroom environment should not favor technical curriculum interests (e.g., *covering the curriculum content)* to an extent that accountability for classroom activities is directed largely towards an external authority. Rather, the teacher should be willing to demonstrate his/her accountability to the class by fostering students' critical attitudes towards the teaching and learning activities. This can be achieved by creating a social climate in which students feel that it is legitimate and beneficial:
(1) to question the teacher's pedagogical plans and methods;
(2) to express concerns about any impediments to their learning.

Items:

3. (+)
9. (+)
15. (+)
21. (+)
27. (+)
32. (+)
39. (-)

IV. SHARED CONTROL SCALE (SC)

This scale is concerned with another important aspect of the development of student autonomy, namely students sharing with their teachers control of the classroom learning environment. In particular, the scale has been designed to measure the extent to which the teacher involves students in the *management* of the classroom learning environment. From a constructivist perspective, students should not be required to adopt the traditional role of compliant recipients of a predetermined pedagogy that is controlled entirely by the teacher. Rather, the teacher should invite students to share control of important aspects of their learning by providing opportunities for them to participate in the processes of:
(1) designing and managing their own learning activities;
(2) determining and applying assessment criteria,
(3) negotiating the social norms of the classroom.

Items:

4. (+)
10. (+)
16. (+)
22. (+)
33. (+)
36. (+)
40. (+)

V. STUDENT NEGOTIATION SCALE (SN)

This scale is concerned with negotiation amongst students as perceived by teachers. The scale has been designed to measure teachers' beliefs concerning students' perceptions of the extent to which they interact verbally with other students for the purpose of building their mathematical knowledge within the consensual domain of the classroom. From a constructivist perspective, the classroom environment should not require students to learn in social isolation from other students or to regard the teacher or textbook as the main arbiter of what counts as viable mathematical knowledge. Rather, the classroom environment should be concerned with engaging students in opportunities:
(1) to explain and justify their newly developing ideas to other students;
(2) to make sense of other students' ideas and reflect on the viability of their ideas;
(3) to reflect critically on the viability of their own ideas.

Items:

5. (+)
11. (+)
17. (+)
23. (+)
28. (+)
34. (+)
41. (+)

VI. ATTITUDE SCALE (AT)

This scale has been included to provide a measure of the concurrent validity of the CLES. The attitude scale has been used extensively in research on science laboratory classes, and has an established reliability. The scale measures teachers' interpretations of student attitudes to important aspects of the classroom environment, including:
(1) their anticipation to the activities;
(2) their sense of worthwhileness of the activities;
(3) the impact of the activities on student interest, enjoyment and understanding.

Items:

6.	(+)	29.	(-)
12.	(+)	35.	(-)
18.	(+)	42.	(-)
24.	(+)		

Salish I Research Project
Constructivist Learning Environment Survey[8]
Science Teacher Form

Date ______________________ Teacher Name ______________________

School ______________________ Course Title ______________________

Directions: For each statement, fill in the circle that best describes your feelings about the class that was videotaped. Please consider each item carefully and answer every item.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
1.	Students learn about the world outside of school.	0	0	0	0	0
2.	Students learn that scientific theories are human inventions.	0	0	0	0	0
3.	It's OK for students to ask "Why do we have to learn this?"	0	0	0	0	0
4.	Students help me to plan what they are going to learn.	0	0	0	0	0
5.	Students get the chance to talk to each other.	0	0	0	0	0
6.	Students look forward to the learning activities.	0	0	0	0	0
7.	New learning starts with problems about the world outside of school.	0	0	0	0	0
8.	Students learn that science is influenced by people's values and opinions.	0	0	0	0	0
9.	Students feel free to question the way they are being taught.	0	0	0	0	0
10.	Students help the teacher decide how well their learning is going.	0	0	0	0	0
11.	Students talk with each other about how to solve problems.	0	0	0	0	0
12.	The activities are among the most interesting at this school.	0	0	0	0	0

(continued)

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[8]Adapted from *Constructivist Learning Environment Survey*, P. Taylor, B. Fraser, & L. White, Curtin University of Technology.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
13.	Students learn how science can be a part of their out-of-school life.	0	0	0	0	0
14.	Students learn that the views of science have changed over time.	0	0	0	0	0
15.	It's OK for students to complain about activities that are confusing.	0	0	0	0	0
16.	Students have a say in deciding the rules for classroom discussion.	0	0	0	0	0
17.	Students try to make sense of each other's ideas.	0	0	0	0	0
18.	The activities make students interested in science.	0	0	0	0	0
19.	Students get a better understanding of the world outside of school.	0	0	0	0	0
20.	Students learn that different sciences are used by people in other cultures.	0	0	0	0	0
21.	It's OK for students to complain about anything that stops them from learning.	0	0	0	0	0
22.	Students have a say in deciding how much time they spend on an activity.	0	0	0	0	0
23.	Students ask each other to explain their ideas.	0	0	0	0	0
24.	Students enjoy the learning activities.	0	0	0	0	0
25.	Students learn interesting things about the world outside of school.	0	0	0	0	0
26.	Students learn that scientific knowledge can be questioned.	0	0	0	0	0
27.	Students are free to express their opinions.	0	0	0	0	0
28.	Students offer to explain their ideas to one another.	0	0	0	0	0
29.	Students feel confused.	0	0	0	0	0

(continued)

In this class ...		Almost Always	Often	Sometimes	Seldom	Almost Never
30.	What students learn has nothing to do with their out-of-school life.	0	0	0	0	0
31.	Students learn that science reveals the secrets of nature.	0	0	0	0	0
32.	It's OK for students to speak up for each other's rights.	0	0	0	0	0
33.	Students have a say in deciding what will be on the test.	0	0	0	0	0
34.	Students explain their ideas to each other.	0	0	0	0	0
35.	The learning activities are a waste of time.	0	0	0	0	0
36.	Students have a say in deciding what activities they do.	0	0	0	0	0
37.	What students learn has nothing to do with the world outside of school.	0	0	0	0	0
38.	Students learn that scientific knowledge is beyond doubt.	0	0	0	0	0
39.	Students feel unable to complain about anything.	0	0	0	0	0
40.	Students have a say in deciding <u>how</u> their learning is assessed.	0	0	0	0	0
41.	Students pay attention to each other's ideas.	0	0	0	0	0
42.	Students feel tense.	0	0	0	0	0

Salish Research Project
Constructivist Learning Environment Survey
Scoring Guidelines for the Science Teacher Form, 1994-1995 Version

This instrument consists of both positive and negative statements which teachers must answer on a scale that ranges from "Almost Always" to "Almost Never." For **positive** item statements, the "Almost Always" choice would receive a 5 moving on down to the "Almost Never" choice which would receive a 1. For **negative** item statements, the numbering procedure is reversed.

Example:

	In this class...	Almost Always	Often	Sometimes	Seldom	Almost Never
(+)1.	students learn about the world outside of school.	0 5	X 4	0 3	0 2	0 1
(-)2.	what students learn has nothing to do with the world outside of school.	0 1	X 2	0 3	0 4	0 5

Sample item one would be scored as a 4 while sample item two would be scored as a 2. The total score would be 4 + 2 = 6, in this example.

I. PERSONAL RELEVANCE SCALE (PR)

This scale is concerned with students' experience of the personal relevance of school science as perceived by teachers. The scale has been designed to measure the extent to which teachers feel that their students perceive the relevance of school science to their out-of-school lives. From a constructivist perspective, the classroom environment should not promote a discontinuity between school science and students' out-of-school lives by evoking an abstract and decontextualized image of science. Rather, the classroom environment should engage students in opportunities:
(1) to experience the relevance of school science to their everyday interests and activities;
(2) to use their everyday experiences as a meaningful context for the development of their formal scientific knowledge.

Items:

1.	(+)	30.	(-)
7.	(+)	37.	(-)
13.	(+)		
19.	(+)		
25.	(+)		

II. SCIENTIFIC UNCERTAINTY SCALE (SU)

This scale is concerned with students' perceptions of science as a fallible human activity as perceived by teachers. The scale has been designed to measure the extent to which teachers feel that their students perceive science to be an uncertain and evolving activity embedded in a cultural context and embodying human values and interests. From a constructivist perspective, the classroom environment should not promote: (1) a *scientistic view* of science as a supreme universal mono-cultural activity that is independent of human interests and values; or (2) the *objectivist* myth that science provides an accurate and certain representation of objective reality (i.e., a correspondence theory of truth). Rather, the classroom environment should be concerned with engaging students in opportunities to learn to be skeptical and critical about the nature and value of science. In particular, to learn:
(1) that scientific knowledge is evolving and provisional;
(2) that scientific knowledge is shaped by social and cultural influences;
(3) that scientific knowledge arises from human interests and values.

Items:

2.	(+)	31.	(-)
8.	(+)	38.	(-)
14.	(+)		
20.	(+)		
26.	(+)		

III. CRITICAL VOICE SCALE (CV)

This scale is concerned with students' development as autonomous learners. In particular, the scale has been designed to measure teachers' assessment of students' perceptions of the extent to which they are able to exercise legitimately a *critical voice* about the quality of their learning activities. From a constructivist perspective, the classroom environment should not favor technical curriculum interests (e.g., *covering the curriculum content)* to an extent that accountability for classroom activities is directed largely towards an external authority. Rather, the teacher should be willing to demonstrate his/her accountability to the class by fostering students' critical attitudes towards the teaching and learning activities. This can be achieved by creating a social climate in which students feel that it is legitimate and beneficial:
(1) to question the teacher's pedagogical plans and methods;
(2) to express concerns about any impediments to their learning.

Items:

3.	(+)	39.	(-)
9.	(+)		
15.	(+)		
21.	(+)		
27.	(+)		
32.	(+)		

IV. SHARED CONTROL SCALE (SC)

This scale is concerned with another important aspect of the development of student autonomy, namely students sharing with their teachers control of the classroom learning environment. In particular, the scale has been designed to measure the extent to which the teacher involves students in the *management* of the classroom learning environment. From a constructivist perspective, students should not be required to adopt the traditional role of compliant recipients of a predetermined pedagogy that is controlled entirely by the teacher. Rather, the teacher should invite students to share control of important aspects of their learning by providing opportunities for them to participate in the processes of:
(1) designing and managing their own learning activities;
(2) determining and applying assessment criteria,
(3) negotiating the social norms of the classroom.

Items:

4. (+)
10. (+)
16. (+)
22. (+)
33. (+)
36. (+)
40. (+)

V. STUDENT NEGOTIATION SCALE (SN)

This scale is concerned with negotiation amongst students as perceived by teachers. The scale has been designed to measure teachers' beliefs concerning students' perceptions of the extent to which they interact verbally with other students for the purpose of building their scientific knowledge within the consensual domain of the classroom. From a constructivist perspective, the classroom environment should not require students to learn in social isolation from other students or to regard the teacher or textbook as the main arbiter of what counts as viable scientific knowledge. Rather, the classroom environment should be concerned with engaging students in opportunities:
(1) to explain and justify their newly developing ideas to other students;
(2) to make sense of other students' ideas and reflect on the viability of their ideas;
(3) to reflect critically on the viability of their own ideas.

Items:

5. (+)
11. (+)
17. (+)
23. (+)
28. (+)
34. (+)
41. (+)

VI. ATTITUDE SCALE (AT)

This scale has been included to provide a measure of the concurrent validity of the CLES. The attitude scale has been used extensively in research on science laboratory classes, and has an established reliability. The scale measures teachers' interpretations of student attitudes to important aspects of the classroom environment, including:
(1) their anticipation to the activities;
(2) their sense of worthwhileness of the activities;
(3) the impact of the activities on student interest, enjoyment and understanding.

Items:

6.	(+)	29.	(-)
12.	(+)	35.	(-)
18.	(+)	42.	(-)
24.	(+)		

Salish I Research Project
The Nature and Implication of Mathematics[9]
Teacher Form

Date ________________________ Teacher Name ______________________________

School ______________________ Course Title ______________________________

Directions: For each statement, fill in the circle that best represents your opinion about the statement. Select one of the following: SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree. Please consider each item carefully and answer every item.

		SA	A	N	D	SD
1.	Mathematics is mostly about performing calculations.	0	0	0	0	0
2.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	0	0	0	0	0
3.	Mathematics is an attempt to know more about the world around us.	0	0	0	0	0
4.	Mathematics involves working with numbers, formulas, and patterns.	0	0	0	0	0
5.	Mathematics and computers offer a great deal of help in solving social problems.	0	0	0	0	0
6.	Any theorem or concept in mathematics can be challenged.	0	0	0	0	0
7.	Mathematics is useless in society.	0	0	0	0	0
8.	Mathematics teaches you how to think through problems.	0	0	0	0	0
9.	Learning mathematics is usually a waste of time.	0	0	0	0	0
10.	Mathematics includes questioning and explaining.	0	0	0	0	0
11.	Knowledge of mathematics and computers helps you personally solve everyday problems.	0	0	0	0	0

(continued)

[9]Adapted from *The Iowa Assessment Handbook;* The University of Iowa, 1993 edition; *Test of Science-Related Attitudes* (TOSRA), developed by Barry J. Fraser, Macquarie University, Sydney, Australie; and *Views on Science-Technology-Society,* 1989, Glen Aikenhead, et al.

		SA	A	N	D	SD
12.	Knowing mathematics can improve a person's life.	0	0	0	0	0
13.	Mathematics classes have given me the confidence to figure things out on my own.	0	0	0	0	0
14.	Mathematics is basically addition, subtraction, multiplication, and division.	0	0	0	0	0
15.	There is always one best way to solve a mathematics problem.	0	0	0	0	0
16.	Fundamental mathematical facts do not change.	0	0	0	0	0

Salish I Research Project
The Nature and Implications of Mathematics

Scoring Guidelines 1995-1996
May, 1996

This instrument consists of both positive and negative statements which NTs and students must answer on a scale that ranges from "Strongly Agree" to "Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+2.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	X 5	0 4	0 3	0 2	0 1
-7.	Mathematics is useless in society.	X 1	0 2	0 3	0 4	0 5

Sample Item Two would be scored as a 5 while Sample Item Seven would be scored as a 1.

SCALES

I. The Social Implications of Mathematics/Computers

2. (+)
3. (+)
5. (+)
8. (+)
10. (+)
11. (+)
12. (+)
13. (+)

The Social Implications of Mathematics/ Computers scale score is computed by adding together the scores for items 2, 3, 5, 8, 10, 11, 12, and 13. This scale score will range from 8 to 40. The internal consistency of this scale is .76.

II. The Usefulness of Mathematics

7. (-)
9. (-)

The Usefulness of Mathematics scale score is computed by adding together the scores for items 7 and 9. This scale score will range from 2 to 10. The internal consistency of this scale is .71.

III. The Nature of Mathematics

1.	(+)	The Nature of Mathematics scale score is computed by adding together the scores for items 1, 4, 14, and 15. This scale score will range from 4 to 20. The internal consistency of this scale is .54.
4.	(+)	
14.	(+)	
15.	(+)	

Salish I Research Project
The Nature and Implications of Mathematics

Scoring Guidelines 1994-1995
Revised March, 1996

This instrument consists of both positive and negative statements which NTs and students must answer on a scale that ranges from "Strongly Agree" to Strongly Disagree." For **positive** item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For **negative** item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+3.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	X	0	0	0	0
		5	4	3	2	1
-7.	Mathematics is useless to society.	X	0	0	0	0
		1	2	3	4	5

Sample Item Three would be scored as a 5 while Sample Item Seven would be scored as a 1.

Three scale scores should be computed, as shown below:

The Usefulness of Mathematics (I)

7. (-)
9. (-)

The Usefulness of Mathematics score is computed by adding together the scores for items 7 and 9. This score will range from 2 to 10. The internal consistency of this scale is .80.

The Social Implications of Mathematics (II)

3. (+)
4. (+)
5. (+)
11. (+)
12. (+)

The Social Implications of Mathematics score is computed by adding together the scores for items 3, 4, 5, 11, and 12. This score will range from 5 to 25. The internal consistency of this scale is .70.

The Nature of Mathematics (III)

10. (+)
15. (+)
16. (+)

The Nature of Mathematics score is computed by adding together the scores for items 10, 15, and 16. This score will range from 3 to 15. The internal consistency of this scale is .67.

Salish I Research Project
The Nature and Implications of Science/Technology[10]
Teacher Form

Date ______________________ Teacher Name __________________________

School ____________________ Course Title ___________________________

Directions: For each statement, fill in the circle that best represents your opinion about the statement. Select one of the following: SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree. Please consider each item carefully and answer every item.

		SA	A	N	D	SD
1.	Science in its basic form means questioning, explaining, and testing.	0	0	0	0	0
2.	Science is the attempt of humans to know more about the world around them.	0	0	0	0	0
3.	Technology is our attempt to manipulate the physical world to solve practical problems.	0	0	0	0	0
4.	Science is limited to working with various objects and materials in classrooms or laboratories.	0	0	0	0	0
5.	Science is frequently humankind's worst enemy.	0	0	0	0	0
6.	Theories and/or basic concepts of science should not be challenged.	0	0	0	0	0
7.	Science is broadly viewed as a way of studying the universe and how it works.	0	0	0	0	0
8.	Technology makes life better for humankind.	0	0	0	0	0
9.	Science offers a way of figuring things out to determine if we understand nature.	0	0	0	0	0
10.	This country is spending too many resources on advancing basic science.	0	0	0	0	0
11.	Science is an activity that should be done in a laboratory.	0	0	0	0	0

(continued)

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[10]Adapted from *The Iowa Assessment Handbook,* The University of Iowa, 1993 edition; *Test of Science-Related Attitudes* (TOSRA), developed by Barry J. Fraser, Macquarie University, Sydney, Australia; and *Views on Science-Technology-Society,* 1989, Glen Aikenhead, et al.

		SA	A	N	D	SD
12.	Most scientists care about the potential effects (both helpful and harmful) that could result from their discoveries.	0	0	0	0	0
13.	Conclusions of scientists may change in the future.	0	0	0	0	0
14.	Scientists should be held responsible for the harm that might result from their discoveries.	0	0	0	0	0
15.	Scientific discoveries can best be made through carefully planned experimentation.	0	0	0	0	0
16.	Knowledge of science and technology helps individuals to deal with everyday problems.	0	0	0	0	0
17.	Technology has little to do with scientific investigation.	0	0	0	0	0
18.	Science and technology offer help in resolving social problems.	0	0	0	0	0
19.	Developers of technology should be held responsible for the harm that might result from their efforts.	0	0	0	0	0

Salish I Research Project
The Nature and Implications of Science/Technology

Scoring Guidelines 1995-96

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Strongly Agree" to Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+1.	Science in its basic form means questioning, explaining, and testing.	X 5	0 4	0 3	0 2	0 1
- 4.	Science is limited to working with various objects and materials in classrooms or laboratories.	X 1	0 2	0 3	0 4	0 5

Sample Item One would be scored as a 5 while sample Item Four would be scored at a 1 for a total score of 5 + 1 = 6.

Scales:

<u>Nature of Science</u> (I)

1.	+	9.	+
2.	+	11.	-
4.	-	13.	+
6.	-	15.	+
7.	+		

<u>Nature of Technology</u> (II)

3.	+
17.	-

<u>Social Implications of Science</u> (III)

5.	-	14.	-
10.	-	16.	+
12.	+	18.	+

<u>Social Implications of Technology</u> (IV)

8.	+	18.	+
16.	+	19.	-

Salish I Research Project
The Nature and Implications of Science/Technology

Scoring Guidelines for 1995-96
May, 1996

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Strongly Agree" to "Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+1.	Science in its basic form means questioning, explaining, and testing.	X 5	0 4	0 3	0 2	0 1
-.6.	Science is frequently humankind's worst enemy.	0 1	X 2	0 3	0 4	0 5

Sample Item One would be scored as a 5 while Sample Item Six would be scored as a 2. Three scale scores should be computed, as shown below.

SCALES

I. Harmfulness of Science/Technology

14. (-)

19.(-)

The Harmfulness of Science/Technology scale score is computed by adding together the scores for items 14 and 19. This scale score will range from 2 to 10, with lower scores indicating that scientists should be held responsible for harm from their efforts. The internal consistency is .78.

II. The Social Implications of Science

2.	(+)	9.	(+)
3.	(+)	10.	(-)
5.	(-)	12.	(+)
7.	(+)	16.	(+)
8.	(+)	18.	(+)

The Social Implications of Science scale score is computed by adding together the scores for items 2, 3, 5, 7, 8, 9, 10, 12, 16, and 18. This scale score will range from 10 to 50. The internal consistency of this scale is .61.

III. The Nature of Science

1.	(+)	11.	(-)
4.	(-)	13.	(+)

The Nature of Science scale score is computed by adding together the

6.	(-)	17.	(-)

scores for items 1, 4, 6, 11, 13, and 17. This scale score will range from 6 to 30. The internal consistency of this scale is .55.

Salish I Research Project
SIDESTEP
Salish Inventory for Demographic Evaluation of Schools and Teacher Education Programs

Standard Operating Procedures

SIDESTEP consists of three parts. Part I is designed to gather information about the preservice experiences of the teacher. Part II is designed to gather information about the current teaching situation of the teacher. Part III is designed to gather information about the social and economic setting of the school.

SIDESTEP - Part I

This part, which will take approximately 10-15 minutes to complete, should be administered as near to the beginning of the school year as possible. It should be given to all first year teachers and to any second or third year teachers who have not yet completed it.

Part I can be administered by itself, or in conjunction with Parts II and III. Each site will need to decide what would be best given the current situation and relationships with the teachers. The instrument can be sent out via mail; the researcher does not need to be on site.

SIDESTEP - Part II

This instrument should be administered near the beginning of each year to each participant. The instrument will take approximately 30 minutes to complete.

Part II can be administered by itself, or in conjunction with Part III. Each site will need to decide what would be best given the current situation and relationships with the teachers. The instrument can be sent out via mail; the researcher does not need to be on site.

SIDESTEP - Part III

This instrument can be administered any time during the school year. It only needs to be administered once per teacher per school. Note, however, that should the teacher change schools, Part III will need to be administered again to reflect the new teaching situation.

Each site will need to decide the best method and data source to complete Part III. This could be through state data, NCISE data, or calling the school administration. The new teacher is NOT a good source to complete this part.

SUMMARIZING SIDESTEP DATA

The Salish I study developed and used the coding scheme following the SIDESTEP for preparing these data for analysis. These codes were entered into an Excel spreadsheet for each teacher for later cross-site analysis. Users of this instrument may want to develop their own scheme that makes sense to them in light of available software and their plans for statistical analysis of these data.

Subsequent to being entered into a spreadsheet, SIDESTEP data for each teacher-year is decoded in the form of a written summary for entry into the Teacher Data Matrix that is included with this package. The table entitled Components of the Teacher Data Matrix shows the part of the SIDESTEP needed to write this summary. An example of such a summary follows the SIDESTEP instrument.

Salish I Research Project
SIDESTEP - Part I
Salish Inventory for Demographic Evaluation of Schools and Teacher Education Programs

Welcome to SALISH! As a way of finding out a few things about your teaching situation, we would like you to complete this form. Thank you for your assistance!

Background Information: To be completed at the end of the student teaching experience.

Name: ______________________ Phone: ______________

Current Address: ______________________________

____

1. Please indicate your: Age _______ Gender (circle one) Male (1) Female (2)

   Ethnicity (circle one): Asian/Pacific Islander (1) African-American (2) Hispanic/Latino (3) White, Not Hispanic (4) Native American/Alaskan Native (5)

   Other, Please Specify (6): ___________

2. Please indicate your academic major, minor, and areas of teaching certification:

   Undergraduate Major: ______________________

   Undergraduate Minor: ______________________

   Graduate Major: ______________________

   Area(s) of teaching certification: ______________________

3. Approximately how many hours of on-site school experience in high school, middle school/junior high, and elementary school did you participate in BEFORE you began student teaching? Check the appropriate number of hours below.

	High School (.1)	Middle School/ Junior High (.2)	Elementary (.3)
none (0)	______	______	______
10 to 20 hours (10)	______	______	______
21 to 40 hours (21)	______	______	______
41 to 60 hours (41)	______	______	______
61 to 80 hours (61)	______	______	______
81 to 100 hours (81)	______	______	______
101 or more hours(101)	______	______	______

4. Please check the extra-curricular activities you were involved with during your undergraduate program. (i.e., organizations, athletics, clubs)

   ______ Social Sorority or Fraternity (1)
   ______ Intramural (2)
   ______ Academic Sorority or Fraternity (3)
   ______ Student Council (4)
   ______ Varsity Athletics (5)
   ______ Science or Mathematics Organization (6)

4. Continued
______ Education Organization (7)
______ Residence Council (8)
______ Department Council, Committee or Organization (9)
______ Church Groups (11)
______ ROTC (12)
______ Community Volunteer (13)
______ Other (10): ________________________________

5. a. For how many weeks did you student teach? ____________

b. Did you student teach ______ full days? (1)
______ half days? (2)
______ less than half days? (3)

6. Referring to your student teaching assignment, indicate the number of sections taught in each of the areas below.

Grade Level - Middle or Junior High School (6-9)

No. of Sections	Subjects Taught	No. of Sections	Subjects Taught
______	6th Grade Mathematics (1)	______	Earth Science (6)
______	7th Grade Mathematics (2)	______	Life Science (7)
______	8th Grade Mathematics (3)	______	Physical Science (8)
______	Pre-Algebra (4)	______	6th Grade Science (10)
______	General Mathematics (5)		

Other, Please Specify (9): ________________________________

Grade Level - High School (9-12)

No. of Sections	Subjects Taught	No. of Sections	Subjects Taught
______	Geometry (1)	______	Biology (7)
______	Pre-Algebra (2)	______	Earth Science (8)
______	Algebra I (3)	______	Physical Science (9)
______	Algebra II (4)	______	Physics (10)
______	Trigonometry (5)	______	General Science (11)
______	General Mathematics/ Consumer Mathematics (6)	______	Chemistry (12)

Other, Please Specify (13): ________________________________

7a. Referring to your student teaching assignment, please report the gender and ethnic group of your cooperating teacher. If you had more than one cooperating teacher, please report the number in each category.

	MALE		FEMALE
______	African American (1)	______	African American (1)
______	Asian or Pacific Islander (2)	______	Asian or Pacific Islander (2)
______	Hispanic or Latino (3)	______	Hispanic or Latino (3)
______	Native American (4)	______	Native American (4)
______	White, Not Hispanic (5)	______	White, Not Hispanic (5)
______	Other, Please Specify: (6)	______	Other, Please Specify: (6)

______________________________ ______________________________

7b. Referring to your student teaching assignment, please report the grade level of your cooperating teacher. If you had more than one cooperating teacher, report the number at each level.

______ Middle School/Junior High ______ High School

Salish I Research Project
SIDESTEP - Part II
Salish Inventory for Demographic Evaluation of Schools and Teacher Education Programs

Background Information: To be completed by all teachers each year.

Date ______________________ Teacher Name ______________________

School ______________________ School Phone ______________________

1. Indicate the number of sections you are teaching this year in each of the areas below.

Grade Level - Middle or Junior High School (6-9)

No. of Sections	Subjects Taught	No. of Sections	Subjects Taught
______	6th Grade Mathematics (4)	______	Earth Science (1)
______	7th Grade Mathematics (5)	______	Life Science (2)
______	8th Grade Mathematics (6)	______	Physical Science (3)
______	Pre-Algebra (7)	______	General Science (10)
______	Algebra (8)	______	6th Grade Science (15)
______	General Mathematics (9)		
______	Geometry (11)		
______	Algebra II (12)		
______	Trigonometry (13)		

Other, Please Specify (14): ______________________________

Grade Level - High School (9-12)

No. of Sections	Subjects Taught	No. of Sections	Subjects Taught
______	Geometry (7)	______	Biology (1)
______	Pre-Algebra (8)	______	Earth Science (2)
______	Algebra I (9)	______	Physical Science (3)
______	Algebra II (10)	______	Physics (4)
______	Trigonometry (11)	______	General Science (5)
______	General Mathematics/	______	Chemistry (6)
	Consumer Mathematics (12)	______	Anatomy/Physiology (14)
______	Integrated Mathematics (15)	______	Bio-technology (16)

Other, Please Specify (17): ______________________________

2. What are your non-teaching assignments? Check all that apply.

______	None (0)	______	Club Sponsor (non-mathematics or science) (7)
______	Athletic Coach (1)	______	Study Hall (8)
______	Mathematics or Science Club Sponsor (2)	______	Detention (9)
______	Tutor (3)	______	Lunch Duty (10)
______	Faculty Committee (4)	______	Hall Duty (11)
______	Class Sponsor (5)	______	Bus Duty/Parking Lot Duty (13)
______	Department Chairperson or Team Leader (6)	______	Homeroom Supervisor (14)

Other, Please Specify (12): ______________________________

3. What specific strategies do you plan to use to address gender equity issues in your classes?

4. Do you currently have any students in your classes who are classified as having special needs?

______ NO ______ YES Please indicate the number ______

What specific strategies do you plan to use to address these special needs (if applicable)?

5. How many students do you have in your classes for whom English is a second language? __________ What specific strategies do you plan to use to address the needs of students with English as a second language (if applicable)?

6. Please report the total number of males and females in your present classes by ethnic group:

	MALES		FEMALES
______	African American (1)	______	African American (1)
______	Asian or Pacific Islander (2)	______	Asian or Pacific Islander (2)
______	Hispanic or Latino (3)	______	Hispanic or Latino (3)
______	Native American (4)	______	Native American (4)
______	White, Not Hispanic (5)	______	White, Not Hispanic (5)
______	Other, Please Specify: (6)	______	Other, Please Specify: (6)
______________________________		______________________________	

7. In the past year, how many times have you attended a state, regional, or national science or mathematics teacher conference?

_____ None _____ One _____ Two _____ Three _____ Four or more times

8. In the past year, how many presentations at a state, regional, or national science or mathematics teacher conference have you made?

______ None _____ One _____ Two _____ Three _____ Four or more times

9. Please list your professional memberships (e.g., NCTM, NSTA, AAPT, state science or mathematics groups).

If you use computers and related electronic technologies, please complete question 10.

10. a) Do you have computers in your classroom? _____ NO _____ YES Please indicate how many. _____
b) Do you have access to a computer lab? _____ NO _____ YES Please indicate how often you use it. _________________________

What is the lab used for? Check all that apply.

______	Drill and practice (1)	______	Enrichment activities (4)
______	Word processing (2)	______	Other: (5) ________________
______	Projects (3)		________________________

c) Do you have access to (check all that apply):

Laser Disc layers (1) ______
CD-ROM (2) ______
Modem (3) ______

11. **If you use a textbook for the class involved in this study, please answer the following:**

Textbook Title: ______________________________

Edition: ______________________ Year Printed: __________

Supplementary Materials Used: (videos, laboratory workbooks, etc. __________

____

For First Year Salish Participants:

12. Does your school have a formal program to help beginning teachers?

_____ NO (0) _____ YES (1)

For Second or Third Year Salish Participants:

13. In the past year, how many presentations at local teacher conferences and/or in-service programs have you made?

_____ None _____ One _____ Two _____ Three _____ Four or more times

14. Please list by title any inservice(s), workshop(s), and or courses(s) that you have attended in the past year.

15. On the average, how many hours per week do you spend preparing to teach. Check the appropriate number.

_____ None (0) _____ 1-5 (1) _____ 6-10 (6) _____ 11-15 (11)
_____ 16-20 (16) _____ Over 20 (21)

16. Which of the following methods have you used to assess your students' understanding? Check all that apply.

_____ Group Work
_____ Worksheets
_____ Discussions With Students
_____ Standardized Tests
_____ Essay/Short Answer
_____ Projects
_____ Oral Reports
_____ Portfolios
_____ Homework
_____ Concept Maps
_____ Multiple Choice Tests
_____ True/False Tests
_____ Fill-In-The-Blank Questions
_____ Student Developed Protocols
_____ Quizzes From the Curriculum
_____ Lab Write-Ups
_____ Computer-Assisted Assessment
_____ Other, Please Specify:
____
____

17. List in order your top three goals for your students' learning:

Most important:

Second most important:

Third most important:

18. Estimate your school's budget in your subject-area (science or mathematics) in each of the following categories?

Expendable Supplies	$________
Equipment	$________
Duplication	$________
Textbooks and other Print Resources	$________
Media and Software	$________
Total	$________

Salish I Research Project
SIDESTEP - Part III
Salish Inventory for Demographic Evaluation of Schools and Teacher Education Programs

To be completed using the most reliable data available.

Date ____________________ School ____________________

Teacher Name ____________________

Administrator Name (or other source) ____________________

1. How would you classify the community served by your school?

______ rural; population < 2,000 (1)
______ small town; population 2,000-5,000 (2)
______ medium town; population 5,000-10,000 (3)
______ small city; population 10,000-25,000 (4)
______ medium city; population 25,000-100,000 (5)
______ large city-suburban; population > 100,000 (6)
______ large city-inner; population > 100,000 (7)

2. Please estimate the income of the families in the community(ies) served by your school, by percentage:

______% $15,000 or below
______% $15,001-$39,999
______% $40,000-$69,999
______% $70,000-$99,999
______% $100,000 or above

3. Approximately how many students are enrolled in your school? ____________________

Example of SIDESTEP summary prepared for a Teacher Data Matrix

USF 212 SIDESTEP DATA SUMMARY 94-95

2. Teacher Actions:

This teacher planned on using the following strategies for addressing gender equity issues:
point out female (symbol) scientist accomplishments as well as male (symbol)

This teacher reported having ~10 SLD/ILAP/EH + ~8 ESOL special needs students in his/her classes.

The following strategies were planned for meeting the needs of special needs students:
Individual counseling;
asking the students how they think they can perform best in my class.
ESOL kids work with interpreter once each week

This teacher reported having ~8 ESOL students in his/her classes.

The following strategies were planned for meeting the needs of ESOL students:
Each will need separate folder; work with ESOL and in Library once/week. I try to pair them w/other bilingual students to help interpret unless behavior becomes a problem

This teacher uses the following methods to assess student understanding:
group work/worksheets/discussions with students/essay/short answer/projects/homework/concept maps/multiple choice tests/true/false tests

4. Resources:

This teacher reported having 1 computer in the classroom.

This teacher did not have access to a computer lab.

This teacher reported using the computer lab..
no data
This teacher reported using the computer lab for the following purposes:
no data
This teacher reported they did have access to these technologies
laser disc players

This teacher utilized the following texts:

Title: Physical Science
Edition: Merrill Year of publication: 1995

6. Context:

This teacher taught the following courses this year:
(Middle or Junior High School)
1 section of Physical Science
(High School)
1 section Physical Science

This teacher had the following non-teaching assignments:
hall duty between classes

This teacher has ~10 SLD/ILAP/EH + ~8 ESOL of students classified as having special needs.

This teacher has ~8 students for whom English is a second language.

This teacher reported the following demographic data on his/her classes:
MALE: 19 African American/20 Hispanic or Latino/50 White, not Hispanic/2 Other, Turkish
FEMALE: 24 African American/1 Asian or Pacific Islander/18 Hispanic or Latino/42 White, Not Hispanic

This teacher's school did have a formal program to help beginning teachers.

This schools budget for science/mathematics was:
this teacher was unaware of such budget.

This teacher classified the community served by the school as :
large city-suburban; population >100,000.

This teacher estimated the distribution of family income served by the school to be:
"unaware"

School enrollment is 1,300.

7. Teachers' Philosophy of Teaching and Learning:

The top three goal's for students' learning that this teacher indicated were:

Most important: understand the major concepts

Second most important: understand enough details to do well on standardized test

Third most important: appreciate importance of science

8. Teacher Response to Student Diversity:

This teacher planned on using the following strategies for addressing gender equity issues:
Point out female scientist accomplishments as well as males.

The following strategies were planned for meeting the needs of special needs students:
Individual counseling; asking the students how they think they can perform best in my class. ESOL kids work with interpreter once each week.

The following strategies were planned for meeting the needs of ESOL students:
Each will need separate folder; work with ESOL and in library once/week. I try to pair them w/other bilingual students to help interpret unless behavior becomes a problem.

9. Self as Teacher:

This teacher has attended 0 state, regional, or national science/mathematics teacher conferences in the past year.

This teacher made 0 presentations at state, regional, or national science/mathematics teacher conferences in the past year.

This teacher reported the following professional memberships:
no data

This teacher made # presentations at local teacher conferences in the past year.
no data

This teacher attended the following inservices, workshops, and or courses in the past year:
no data

This teacher reported spending 15-20 hours of time per week preparing to teach.

Salish I Research Project
Teachers' Pedagogical Philosophy Interview

Standard Operating Procedures

The Teachers' Pedagogical Philosophy Interview (TPPI) should be administered between the third and seventh months of each school year a teacher is in the study. It is best done face-to-face, but it can be done over the telephone if a face-to-face interview is not possible. TPPI sessions should be audiotaped and transcribed; interviewers may want to take notes as well. Researchers should insure that the NT is close enough to the microphone to be heard. Some of the questions are stated in terms of "science/mathematics." Researchers should read the appropriate discipline for the teacher being interviewed.

There are two versions of the TPPI — one for First Year Teachers (teachers in their first year of teaching) and one for Second or Third Year Teachers (teachers in their second or third years of teaching). Specific instructions for these versions are shown below. A good reference on interviewing is *Qualitative Research Methods* by M. Q. Patton (1980, Sage Publications).

First Year Teachers

The TPPI for teachers who are in their first year of teaching consists of 44 Level I Questions and six Level II (optional) Questions. Ideally, this interview should be divided into two sessions. Questions 1-25 could be administered during the first session and Questions 26-44 (and 45-50, if desired) could be administered during the second session. The total interview time should be approximately 1 1/2 hours.

Second or Third Year Teachers

Teachers who are in their second or third years of teaching should be administered the 34-question Second or Third Year Teacher version of the TPPI. This version also includes 15 questions at Level II. The Level I section of the interview can be administered in one sitting. If both Level I and Level II questions are to be asked, as with the TPPI for First-Year Teachers, two sessions are ideal. The total interview time for the Level I Questions should be approximately one hour.

CODING SCHEME FOR TPPI

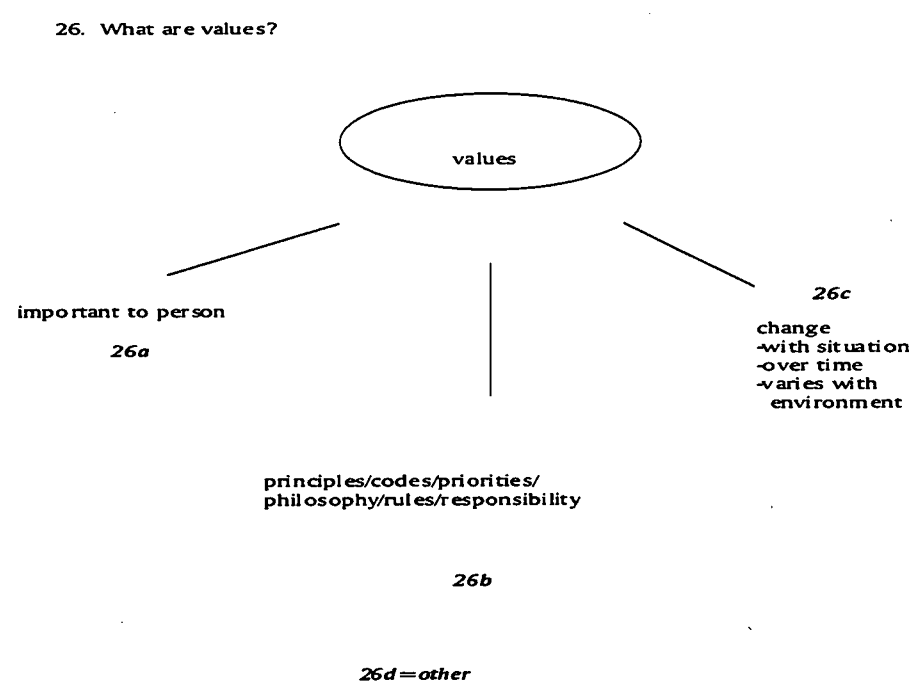
Format of the Coding Scheme

The following information provides an a priori coding scheme for categorizing data from TPPI interview transcripts produced for each year of data collected[11]. A teacher is the unit of analysis for this coding scheme. The codes emerged as a product of iterative discussions among Salish team members as they analyzed many interviews over two years. Three levels of analysis were built into the final scheme to code answers to the questions from the TPPI.

<u>Level One Analysis</u>
The first level of analysis is presented in the form of maps. Each TPPI question has a map of its own. Each statement on a map is a category for data extracted from an interview transcript. Each category has a code number and letter near it (see Figure 1).

<u>Figure 1</u>

A sample TPPI coding map



<u>Level Two Analysis</u>

The second level of analysis of the TPPI coding scheme is in the form of a matrix. The matrix for the second level of analysis shows which codes from the first level of analysis fit into which \ columns and rows on the matrix (see Figure 2). The categories (codes) from the first level of analysis were collapsed into categories called super codes and placed on the matrix. A super code is a row by columm code. It consists of a column heading indicating teacher style combined with a row heading labeling an aspect of what is happening in the classroom. The parameters for each super code category in the second level of analysis are the categories of the STAM. The categories

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[11] (This coding scheme does not address question 5, or questions 45 and higher on either form of the TPPT. These items were not part of the final analysis for Salish I.

used as labels for columns are didactic, transitional, conceptual, early constructivist, experienced constructivist, and inquiry.

Figure 2

Excerpt from TPPI supercode scheme

	Teacher Styles Level 1 categories TEACHER CENTERED		CONCEPTUAL	STUDENT CENTERED		
Aspects of Classroom	Level 2 STAM categories DIDACTIC	TRANSITIONA	CONCEPTUAL	EARLY CONSTRUCTIVIS	EXPERIENCE CONST.	INQUIRY
	Supercodes					
TEACHER/ CONTENT	TCDIDA	TCTRAN	TCCONC	TCEARL	TCEXPE	
	Level 1 TPPI codes					
	12a-d,g,i-m			12e,f,h,n-q		
	14a, b, h-j,o,p	14c-f, k-m				

The categories used as labels for rows represent what is going on in the classroom. Some Some categories were added beyond those of the STAM The labels are "teacher/content, self as teacher, student actions, environment, context, diversity, philosophy of teaching." The latter labels are called "aspects" herein. Each row heading actually contains several horizontal "rows". The boundary for each label is designated by darkened lines above and below the label. A teacher's style for a particular aspect is determined by combining the various TPPI response codes in each column between the dark horizontal lines for each aspect. The distribution of the codes across the columns determines the teacher's style for an aspect.

This first set of super codes enables the researcher to relate the self report data in categories that emerged from the TPPI interviews to categories in video taped classroom observation data analyzed with the STAM instrument. There were TPPI questions that corresponded to all the aspects. However, codes were not developed to correspond to all of the teacher styles in STAM.

Level Three Analysis

The third level of analysis of the TPPI coding scheme is also in the form of a matrix. The categories from the second level of analysis were collapsed into another set of super code categories. Didactic and transitional codes were combined in the teacher centered column, conceptual codes were placed in conceptual column, and early constructivist, experienced constructivist, and inquiry super codes from level two were combined into the student centered column for level three.

Getting Oriented to the Coding Scheme

Step 1. Read responses to a specific question on several transcripts to get an idea of the types of statements respondents made to that question.

Step 2. Read the descriptors of each category on the map that matches the question you just read. Determine your interpretation of the category (thus the interpretation of the code).

Coding an Interview Transcript

Level One Coding

Read the answer to the question in one transcript. Highlight text that appears to be relevant to one or more of the categories on the maps. Place the information into categories from the related map. Record the code numbers and letters of the category, or categories, related to a highlighted segment in the margin of the transcript. Where you have more than one code for a block of text, be sure to make it clear with lines or arrows which word or phrase stimulated you to place a particular code in that margin.

(Why would you highlight more than just the specific word, phrase, or sentence that fits into a category? The reason one may be highlighting more than just a phrase or a sentence in a specific paragraph is to preserve the context from which you are inferring a particular meaning and assigning the code. This is important when several people are coding the same material, because it helps researchers compare the types of statements they each used to assign data to a category (code) and reach consensus on codes. When highlighted/coded information gets separated from the original transcript, as it does when one uses a computer program to assist in coding and analysis, it makes the documentation for your interpretations and quotations visible.

Level Two Coding

Make a copy of the entire super code matrix for level two analysis found in this section of the instrument package for each teacher in your sample. Review one teacher's transcript at a time. Copy the code in the margin next to the highlighted portion of the text into the matching cell in the matrix. Proceed one question at a time.

When you have completed the matrix for a teacher, translate the codes in the cells into written paragraphs. This paragraph will reflect the distribution of the codes across columns. Construct each paragraph using the language describing the categories for level one the codes used earlier. In essence, you are decoding the matrix for a reader. Construct one paragraph for each aspect measured by the TPPI (e.g., teacher/content, self as teacher, student actions, etc.). One paragraph should describe the data across rows thus describing one aspect. Consider the distribution of codes across columns and choose from the following labels "didactic, transitional, conceptual, early constructivist, experience construtivist, and inquiry". There may be an array of responses in which case select the various labels that describe the data for each. Repeat this process for each set of TPPI super codes related to each aspect. Three examples of "paragraphs" appear at the end of this description of the TPPI coding scheme.

The extent to which teachers' responses on their TPPI's correspond with the TPPI codes that are identified in the column below each super code, you would decide which super code(s) describes the teacher in regard to that aspect. For example, codes of 12a, 14a, 15c, and 35a would receive the super code TCDIDA which indicates this teacher's responses related to teacher/content on the TPPI could be labeled didactic in a level two analysis.

A teacher's results may fall into more than one column indicating that the teacher's style varies. This makes it difficult to assign as single label and a researcher must make judgement calls based on self determined weighting of responses, being aware that the existance of the variety may have significant meaning.

Coding Level Three

For level 3 analysis, review each teacher's completed level two matrix in your sample, one at a time. Attend to the columns and heading created by the degrees of gray shading on the matrix. Write one paragraph for each aspect measured by the TPPI. Select from the labels "teacher centered, conceptual, and student centered" to orient each paragraph describing the teacher's self perception of what he/she thinks and does. Include data from the row for one aspect. For teacher centered, include all the cells shaded in medium gray. For conceptual, use the cells in the middle column of the matrix that are slightly shaded. For student centered, use all the cells shaded in the darker gray. These paragraphs will be entered into another matrix, the "Teacher Data Matrix", when data from various instruments are triangulated later in the study.

Next Step
In order to discuss a specific group of teachers related to a single aspect measured by the TPPI, or related to a specific program feature, a next step might be to lay one matrix over the other to summarize the number of teachers who answered a particular question in a particular way. Also, these paragraphs will become part of the Teacher Data Matrix that is used for comparing data about a teacher across several teacher data measures (instructions for creating this matrix are at the end of this teacher maesures section).

Examples of ways to write the paragraphs for level two describing aspects of the TPPI
(Summary of TPPI)

Method 1

Teacher Actions
IUP109 exhibits actions across DIDACTIC, TRANSITIONAL and CONCEPTUAL styles of teaching. This teacher indicated class size and time as the CLASSROOM CONSTRAINTS which indicate DIDACTIC in nature. However, this teacher's handling of these CONSTRAINTS suggests that this teacher tends to be CONCEPTUAL in nature. She indicated that she overcomes the constraints by ALTERING her INSTRUCTION.

IUP109 makes DECISIONS about curriculum in a DIDACTIC fashion by following mandated CURRICULUM. This teacher's CLASSROOM ORGANIZATION skills tends to indicate her nature to be both DIDACTIC and TRANSITIONAL. She believed that an organized classroom should not be messy or dangerous to the kids, which reflects her DIDACTIC NATURE. On the other hand, TRANSITIONAL nature reflects through her description of the organized classroom in terms of planning.

IUP109 moves to the NEXT CONCEPT when students do well on the tests which reflects TRANSITIONAL styles of teaching. The teacher acts in a TRANSITIONAL method when it comes to manipulating EDUCATIONAL
ENVIRONMENT to maximize students understanding. She executes TRANSITIONAL methods by doing a variety of classroom activities such as taking kids outside.

Method 2

IUP109YR1 - Teacher Actions

IUP109 exhibits actions across three categories - DIDACTIC, TRANSITIONAL and CONCEPTUAL.

IUP109's views towards CLASSROOM CONSTRAINTS tends to be DIDACTIC as evidenced by 23g,p.

IUP109's DEALING WITH CONSTRAINTS tends to be CONCEPTUAL in nature as indicated by 24c.

IUP109's DECISION ABOUT CURRICULUM is geared towards DIDACTIC as evidenced by 18b.

IUP109's views on CLASSROOM ORGANIZATION falls between DIDACTIC and
TRANSITIONAL teaching styles. These were evidenced by 3a,b.

IUP109's decision about moving FROM ONE CONCEPT TO THE OTHER indicates the TRANSITIONAL styles in nature.

IUP109's actions on manipulating EDUCATIONAL ENVIRONMENT seems to be guided by TRANSITIONAL style of teaching which was evidenced by
33c.

Method 3
TEACHER CONTENT

=B7 TAM3353=92s VIEW OF SCIENCE is mainly DIDACTIC. Facts are
° obtained thro=ugh experimentation and are accepted as TRUTH. Laws
are rules. Science is a way of understanding the world. The view of theories as HYPOTHESES is EARLY
CONSTRUCTIVIST.
=B7 TAM3353 VALUES the everyday use of science, which is
TRANSITIONAL.
=B7 TAM3353=92s STUDENTS=92 VIEW OF SCIENCE is
TRANSITIONAL. Students should=
view science as RELEVANT, and approach the subject positively.
They should want to take MORE SCIENCE in the future.
=B7 TAM3353=92s IMPORTANT CONCEPT FOR STUDENTS are
CONCEPTUAL. Students shou= ld have a certain amount of
KNOWLEDGE of earth science.

SELF AS TEACHER

=B7 TAM3353=92s ORGANIZATION is TRANSITIONAL with a focus on the TEACHER=92S actions, as well as CONSTRUCTIVIST with a focus on STUDENTS=92 ACTIVITY lev= els.
=B7 STRENGTHS of TAM3353 are both PRESCRIPTIVE and

CONSTRUCTIVIST. A strong
CONTENT KNOWLEDGE and SELF-ATTRIBUTE of caring are mentioned.
=B7 IMPROVEMENTS for TAM3353 are PRESCRIPTIVE. A need for
IMPROVED LECTURING
TECHNIQUES is noted.
=B7 TAM3353 REALIZED S/HE WAS BECOMING A GOOD TEACHER
when there was positiv= e
=46EEDBACK from the community, a CONSTRUCTIVIST feature.

TEACHER ACTIONS

=B7 TAM3353=92s ORGANIZATION is TRANSITIONAL with a focus on
the TEACHER=92S actions, and also incorporates STUDENTS=92
ACTIVITY level which is an EARLY
CONSTRUCTIVIST feature.
=B7 DECISIONS ABOUT WHAT TO TEACH are based on DIDACTIC
features such as a curriculum based on the TEXTBOOK.
=B7 MOVING TO THE NEXT CONCEPT is based on the TRANSITIONAL
feature of movin= g when the MATERIAL IS COVERED.
=B7 CONSTRAINTS FOR IMPLEMENTING BEST TEACHING/LEARNING
SITUATIONS are
DIDACTIC, involving LACK OF RESOURCES.
=B7 TAM3353 MAXIMIZES THE LEARNING ENVIRONMENT through
TRANSITIONAL means.
Changing the PHYSICAL SURROUNDINGS and varying activities are
methods of maximizing learning. Having a safe environment emotionally
is also important=

STUDENT ACTIONS

=B7 STUDENTS LEARN BEST by DOING, a CONCEPTUAL feature.
=B7 STUDENTS UNDERSTAND when they MAKE CONNECTIONS, a
CONCEPTUAL method.
=B7 STUDENTS DEMONSTRATE THEIR LEARNING and BELIEVE THEY
UNDERSTAND in EARLY
CONSTRUCTIVIST methods. They do this through their verbal
INTERACTIONS and
EXPLANATIONS to other students.
=B7 TAM3353 MAXIMIZES THE LEARNING ENVIRONMENT through
TRANSITIONAL means.
Changing the PHYSICAL SURROUNDINGS and varying activities are
methods of maximizing learning. Having a safe environment emotionally
is also important=

=B7 STUDENTS VIEW OF SCIENCE should be one of RELEVANCE,
enjoyment, and interest in future science classes. These are
TRANSITIONAL features.
=B7 TAM3353 CHANGES INSTRUCTIONAL TECHNIQUES and gives
verbal directions on tests for STUDENTS WITH SPECIAL NEEDS. These
are CONCEPTUAL features.

ENVIRONMENT

=B7 STUDENTS LIKE CLASS because of the LABORATORY WORK, a

CONSTRUCTIVIST fea= ture.

CONTEXT

=B7 IMPEDIMENTS on TAM3353 are PRESCRIPTIVE. MONEY and space constraints are cited.
=B7 INFLUENCES on TAM3353 are CONSTRUCTIVIST. Preparing students to do well = on future STATE TESTS is one influence.

DIVERSITY

=B7 TAM3353 gives VERBAL DIRECTIONS and gives verbal help on tests for
STUDENTS WITH SPECIAL NEEDS, a CONSTRUCTIVIST method.

PHILOSOPHY OF TEACHING

=B7 TAM3353=92s FOUNDING PRINCIPLES OF TEACHING involve having a LOVE OF
STUDENTS and having a strong knowledge background, all EARLY CONSTRUCTIVIST perspectives.
=B7 TAM3353 LEARNS BEST through DOING ACTIVITIES, a TRANSITIONAL method, and
VISUALLY, a DIDACTIC method.
=B7 TAM3353 KNOWS S/HE HAS LEARNED through the SOCIAL experience of explaini= ng the material to someone else, and KNOWS S/HE KNOWS when s/he can teach someone else the information; these are EARLY CONSTRUCTIVIST methods.
=B7 TAM3353 LEARNS through CONCEPTUAL methods. Science is learned BY DOING labs, and math/history are different because they are learned by reading rather than hands-on.
=B7 A GOOD LEARNER is one who has characteristics such as trying hard, an
EARLY CONSTRUCTIVIST feature.
=B7 VALUABLE LEARNING involves PROBLEM SOLVING, a CONCEPTUAL feature.
=B7 TAM3353 MODELS BEST TEACHING/LEARNING SITUATIONS through STUDENT DIRECTE=
D activities, an EARLY CONSTRUCTIVIST method.
=B7 STUDENTS LEARN BEST by DOING, and UNDERSTAND when they MAKE CONNECTIONS, both CONCEPTUAL features.
=B7 STUDENTS DEMONSTRATE LEARNING and BELIEVE THEY UNDERSTAND in EARLY
CONSTRUCTIVIST methods. They do this through their VERBAL INTERACTIONS and
EXPLANATIONS to other students.

Salish I Research Project
Teachers' Pedagogical Philosophy Interview[12]
First Year Teachers

Level I Interview Questions

1. How would you describe yourself as a classroom teacher?

2. What role model do you have for yourself as a classroom teacher?

3. Describe a well-organized classroom. When you have your classroom running the way you want it, what is it like?

4. How did you form this model of the well-organized classroom?

5. How long did it take you to develop this model of teaching?

6. What do you consider to be the founding principles of teaching? If you had to write a book describing the principles that teaching should be built on, what would those principles be?

7. How do you learn best?

8. How do you know when you have learned?

9. How do you know when you know something?

10. What are facts, laws, and theories in science/mathematics?

11. How are facts arrived at?

12. How do you distinguish among facts, laws, and theories in science/mathematics?

13. When you picture a good learner in your mind, what characteristics of that person lead you to believe that they are a good learner?

14. What is science/mathematics?

15. In what ways do you learn science/mathematics best?

16. When you learn science/mathematics, is it different than learning mathematics/science or history?

17. What are the founding principles of science/mathematics?

18. How do you decide what to teach and what not to teach?

19. How do you decide when to move from one concept to another?

20. What learning in your classroom do you think will be valuable to your students outside the classroom environment?

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[12]Developed by Lon Richardson and Patricia Simmons.

21. Describe the best teaching/learning situation that you have ever experienced.

22. In what way do you try to model that best teaching/learning situation in your classroom?

23. What are some of the impediments or constraints for implementing that kind of model in your classroom?

24. What are some of the tactics you use to overcome these constraints?

25. Are there any things at the local/school/state levels that influence the way you teach? What are some examples of this?

26. What are values?

27. How do you arrive at these values?

28. What are some of the things you value most about science/mathematics?

29. How do you believe your students learn best?

30. How do you know when your students understand a concept?

31. How do you know when learning is occurring, or has occurred in your classroom?

32. How do you think your students come to believe in their minds that they understand something?

33. In what ways do you manipulate the educational environment (classroom, school, etc.) to maximize student understanding?

34. What science/mathematics concepts do you believe are the most important for your students to understand by the end of the school year?

35. How do you want your students to view science/mathematics by the end of the school year?

36. What values do you want to develop in your students?

37. What are some of the things you believe your students value most about their educational experience in your classroom? When they leave here they say, 'I really liked (his/her) class because __________'.

38. How do you accommodate students with special needs in your classroom?

39. What do you believe are your main strengths as a teacher?

40. In what areas would you like to improve as a teacher?

41. When did you realize you were becoming a good teacher, understanding that you were having a positive effect on your students and satisfied that you were doing the right thing?

42a. Were your undergraduate education/pedagogy courses beneficial to you when you began teaching? Why or why not?

42b. Were your undergraduate science/mathematics courses beneficial to you when you began teaching? Why or why not?

43a. What changes would you make in undergraduate education/pedagogy courses, if you could, to make the experience more meaningful?

43b. What changes would you make in undergraduate science/mathematics courses, if you could, to make the experience more meaningful?

44. In reference to the teaching model or teaching package that you have developed.....if you had to divide that up into a pie chart, how much of that chart would come from undergraduate training, graduate training, your on-the-job experience, or anything else that you can think of?

Level II Interview Questions

45. How do you define truth?

46. Is there a relationship between science/mathematics and truth? What is that relationship (if yes)?

47. How do you define technology?

48. Is there a relationship between science/mathematics and technology? What is that relationship (if yes)?

49. How do you define society?

50. Is there a relationship between science/mathematics and society? What is that relationship (if yes)?

Salish I Research Project
Teachers' Pedagogical Philosophy Interview[13]
Second and Third Year Teachers

Level I Interview Questions

1. How would you describe yourself as a classroom teacher?

2. What role model do you have for yourself as a classroom teacher?

3. Describe a well organized classroom. When you have your classroom running the way you want it, what is it like?

4. How did you form this model of the well-organized classroom?

5. How long did it take you to develop this model of teaching?

6. Now that you have more teaching experience, what do you consider to be the founding principles of teaching? If you had to write a book describing the principles that teaching should be built on, what would those principles be?

7. How do you learn best?

8. How do you know when you have learned?

9. How do you know when you know something?

10. When you picture a good learner in your mind, what characteristics of that person lead you to believe that they are a good learner?

11. How do you decide what to teach and what not to teach?

12. How do you decide when to move from one concept to another?

13. What learning in your classroom do you think will be valuable to your students outside the classroom environment?

14. Describe the best teaching/learning situation that you have ever experienced.

15. In what way do you try to model that best teaching/learning situation in your classroom?

16. What are some of the impediments or constraints of implementing that kind of model in your classroom?

17. What are some of the tactics you use to overcome these constraints?

18. Are there any things at the local/school/state levels that influence the way you teach? What are some examples of this?

19. How do you believe your students learn best?

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[13]Developed by Lon Richardson and Patricia Simmons

20. How do you know when your students understand a concept?

21. How do you know when learning is occurring or has occurred in your classroom?

22. In what ways do you manipulate the educational environment to maximize student understanding?

23. What science/mathematics concepts do you believe are the most important for your students to understand by the end of the school year?

24. How do you want your students to view science/mathematics by the end of the school year?

25. What values do you want to develop in your students?

26. What are some of the things you believe your students value most about their educational experience in your classroom? When they leave here they say, 'I really liked (his/her) class because ______________.'

27. How would you compare your approach to teaching this year to last year's approach? Why is it the same/different?

28. How do you accommodate students with special needs in your classroom?

29. What do you believe are your main strengths as a teacher?

30. In what areas would you like to improve as a teacher?

31. When did you realize you were becoming a good teacher, understanding that you were having a positive effect on your students and satisfied that you were doing the right thing?

32a. Were your undergraduate education/pedagogy courses beneficial to you when you began teaching? Why or why not?

32b. Were your undergraduate science/mathematics courses beneficial to you when you began teaching? Why or why not?

33a. What changes would you make in undergraduate education/pedagogy courses, if you could, to make the experience more meaningful?

33b. What changes would you make in undergraduate science/mathematics courses, if you could, to make the experience more meaningful?

34. In reference to the teaching model or teaching package that you have developed.....if you had to divide that up into a pie chart, how much of that chart would come from undergraduate training, graduate training, your on-the-job experience, or anything else that you can think of?

Level II Interview Questions

35. What are facts, laws, and theories in science/mathematics?

36. How are facts arrived at?

37. How do you distinguish among facts, laws, and theories in science/mathematics?

38. What is science/mathematics?

39. In what ways do you learn science/mathematics best?

40. When you learn science/mathematics, is it different than learning mathematics/science or history?

41. What are the founding principles of science/mathematics?

42. What are values?

43. How do you arrive at these values?

44. What are some of the things you value most about science/mathematics?

45. Is there a relationship between science/mathematics and truth? What is that relationship (if yes)?

46. How do you define technology?

47. Is there a relationship between science/mathematics and technology? What is that relationship (if yes)?

48. How do you define society?

49. Is there a relationship between science/mathematics and society? What is that relationship (if yes)?

TPPI SUPER CODES

	Teacher Styles Level 1 categories TEACHER CENTERED		CONCEPTUAL	STUDENT CENTERED		
Aspects of Classroom	Level 2 STAM categories DIDACTIC	TRANSITIONAL	CONCEPTUAL	EARLY CONSTRUCTIVIST	EXPERIENCED CONST.	CONST. INQUIRY
	SUPERCODES					
TEACHER/ CONTENT	TCDIDA	TCTRAN	TCCONC	TCEARL	TCEXPE	
	Level 1 TPPI codes					
	12a-d,g,i-m			12e,f,h,n-q		
	14a, b, h-j,o,p	14c-f, k-m				
	11a,g	11c		11b,d,e,h		
	15d,g,k,l	15 c	15e,m	15b,f, h,n		
	17a-c,e-g,i,l	17k,n,o		17h,j		
		28a,c-f		28b		
			34e,h,i	34a,c,d,f	34b	
	35a	35b,e-l,p	35c	35m,o		
	SUPERCODES					
SELF AS TEACHER	STDIDA	STTRANS		STCONSTR		
	Level 1 TPPI codes					
	39a-d,j			39e-h		
	40a-e,l			40f,g,h,i,j		
	41m,n			41f-j		
	3a,e	3b,d,f-i		3c,j		

continued next page

	SUPERCODES					
TEACHER ACTIONS	TADIDA	TATRAN	TACONC	TAEARL	TAEXPE	
	3a,e	3b,d,f-i		3c,j		
	18a,b	18c,d,h,i		18e,f	18g	
	19f,d, h	19c,e,i-l		19a,i	19b	
	23f-n,p			23a-e		
	24a,e,f		24c	24b		
	33b,k	33a,c,d,l	33f-h	33e,i,m		
STUDENT ACTIONS	SADIDA	SATRAN	SACONC	SAEARL		SAINQU
	29d,e,p	29c	29b,g,l,m,o	29f,h,i,k,n		
	31g,h	31i		31a-d,f		31k
	30a,c,h	30g	30b,d,e	30j		30i
	32a-d,f-h			32e		
	33b,k	33a,c,d,l	33f-h	33e,i,m		
	35a	35b,e-l,p	35c	35m,o		
	38g	38c,f	38a,b,e			
ENVIRONMENT	ENVTCHCN			ENVSTUCN		
	37b,i,j,l,n			37a,c,d,e,f,k,m		
	SUPERCODES					
CONTEXT	CONTCHCN			CONSTUCN		
	23f-n,p			23a-e		
	24a,c,e,f			23b		
	25d,f-i			25e		

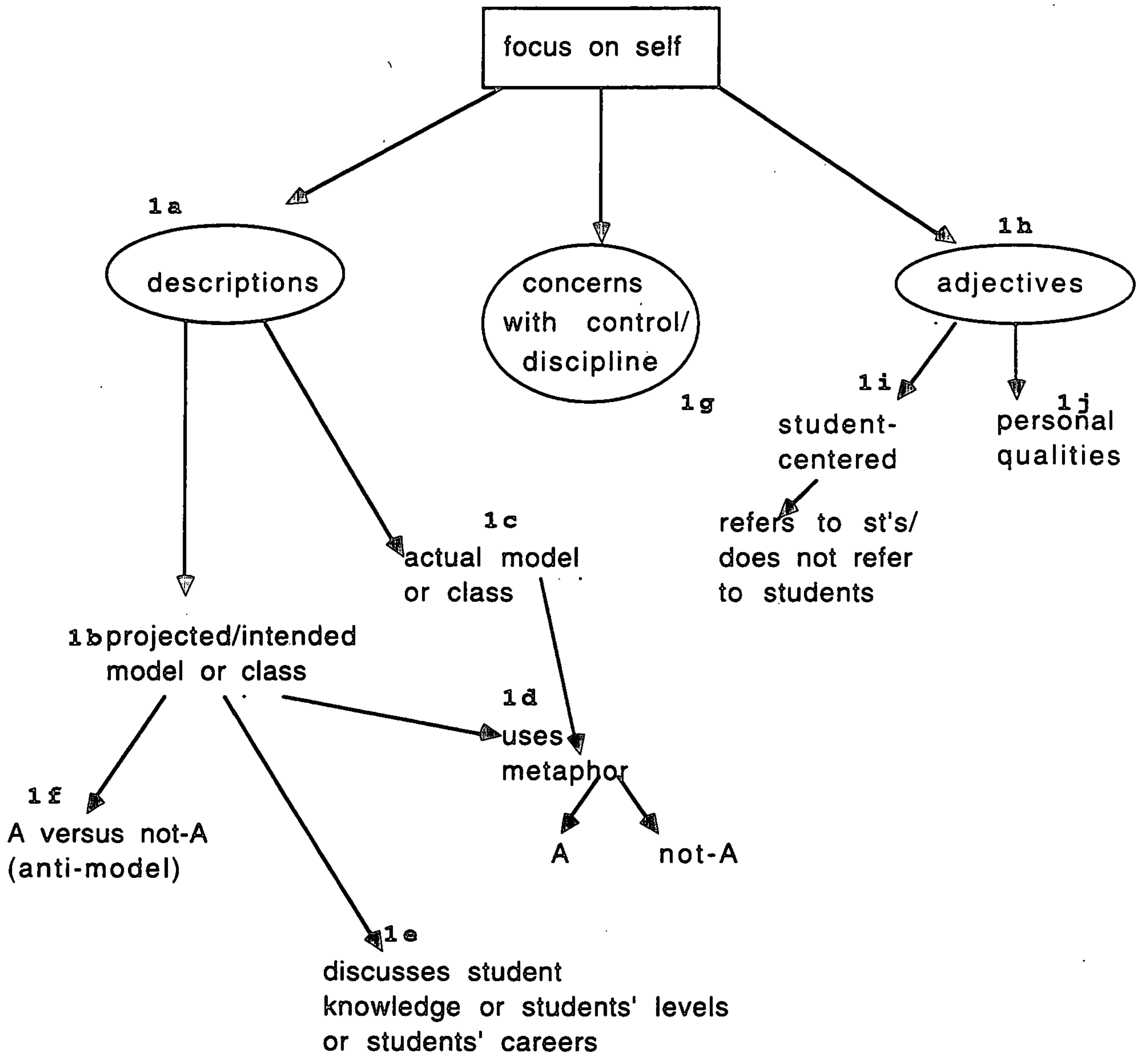
continued on next page

	SUPERCODES					
DIVERSITY	DIVDIDA	DIVTRAN	DIVCONC			
	38g	38c.f	38a.b.c			

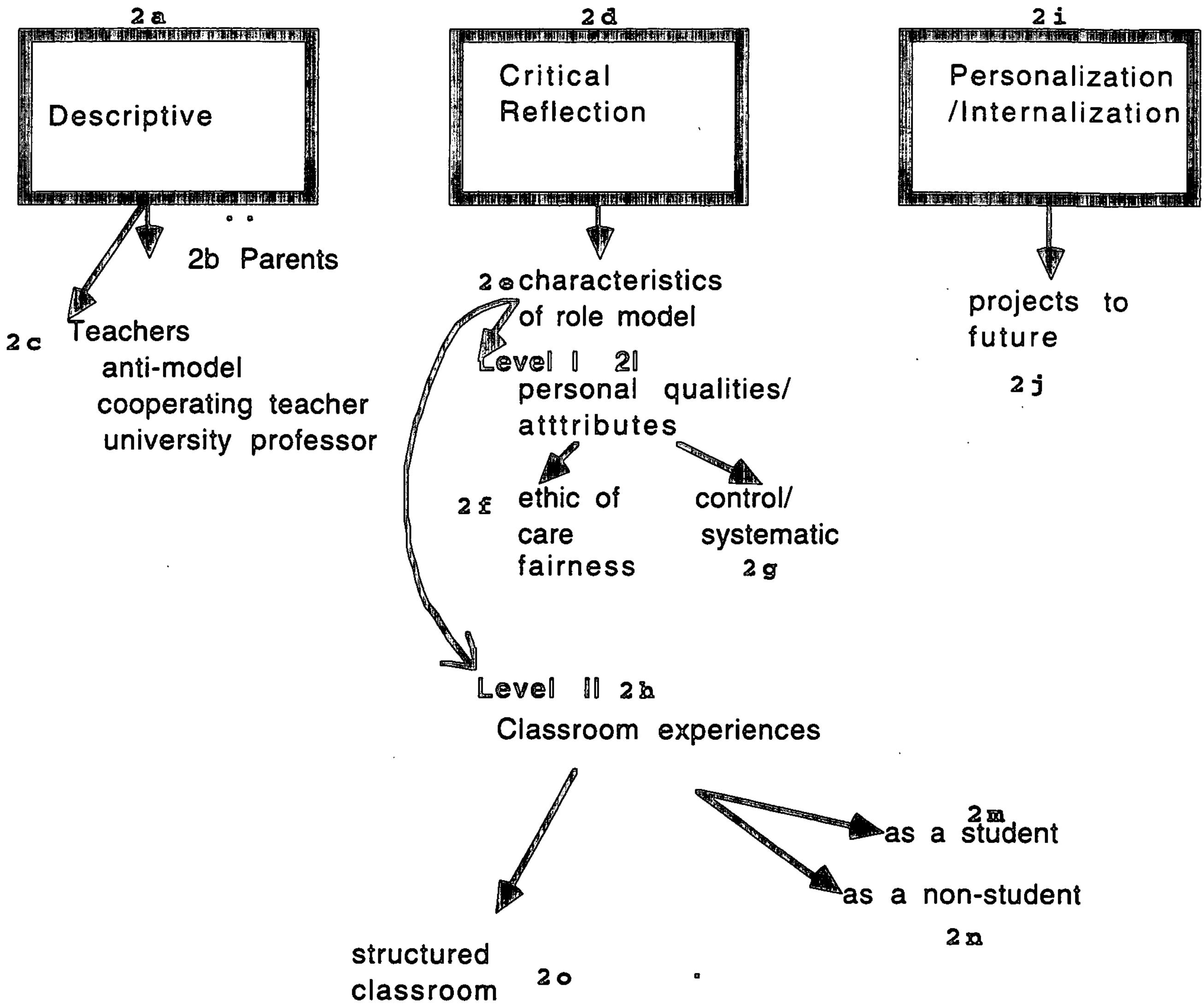
PHILOSOPHY OF TEACHING	PTDIDA	PTTRAN	PTCONC	PTEARL	PTEXPE	PTINQU
	6d.g.k.n			6a-c,e.f.m-o		
	7a-d.m	7j		7e.f,h	7g	
	8a		8j.k.m	8b-g	8h	
	9a		9c	9b.d		
	13h-j			13a-g,l		
	15d,g.k,l		15e.j.m	15b,f,h,n		
		16g.o	16b-e.j.l.n	16h.k.m		
	20d		20a.f	20b.c		
	21d,e,g.i,n.q.r			21 l,m,o,p		
	22e,g.h.k.q	22a.b.i.j	22f.l. p	22c,d.m	22n	
	29d.e.p	29c	29b.g.l.m.o	29f.h.i.k,n		
	30a.c.h	30g	30b.d.e	30j		30i

I) SELF AS A TEACHER:

1) HOW WOULD YOU DESCRIBE YOURSELF AS A CLASSROOM TEACHER?



2) WHAT ROLE MODEL DO YOU HAVE FOR YOURSELF AS A CLASSROOM TEACHER?

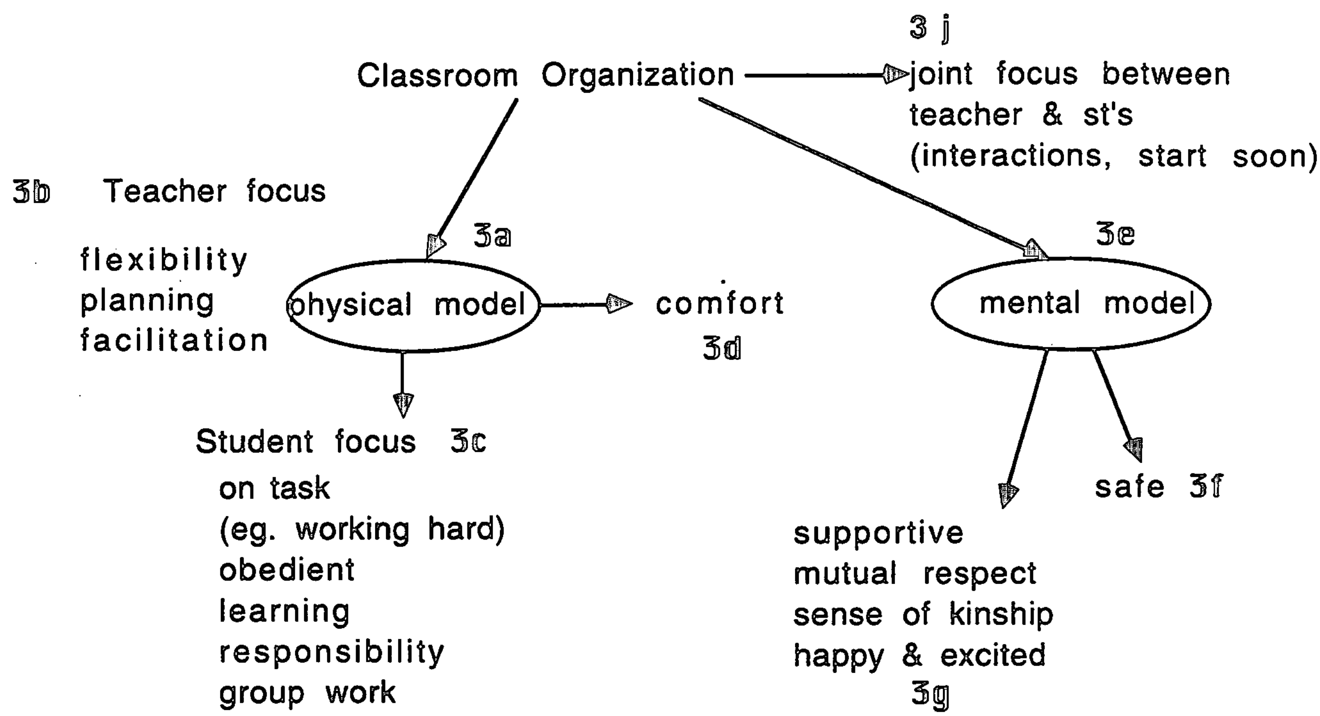


2k=none

2p=life experiences

2q=other

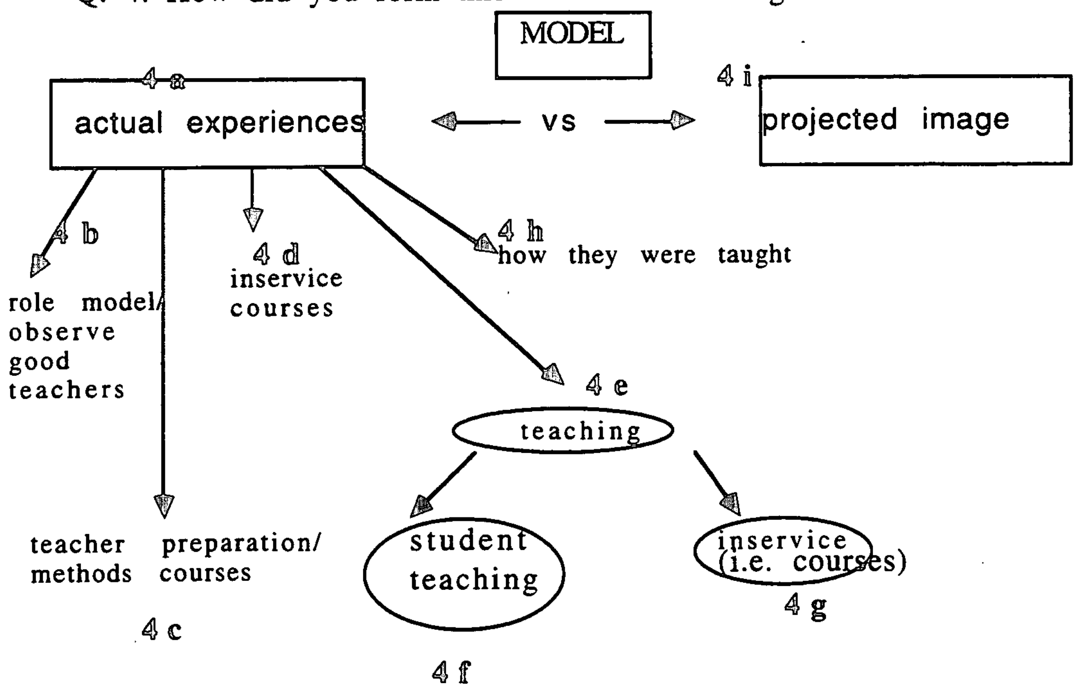
Q. 3. Describe a well organized classroom.



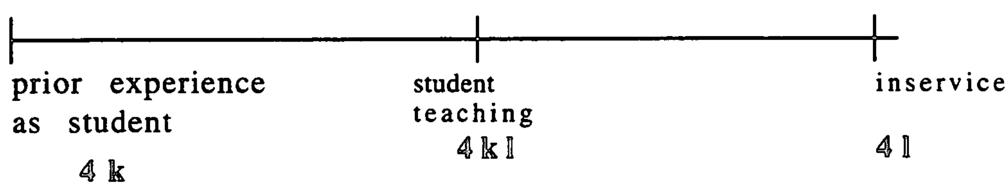
3h=classroom management
3i=atypical/varied planning

3k=other

Q. 4. How did you form this model of well organized classroom?

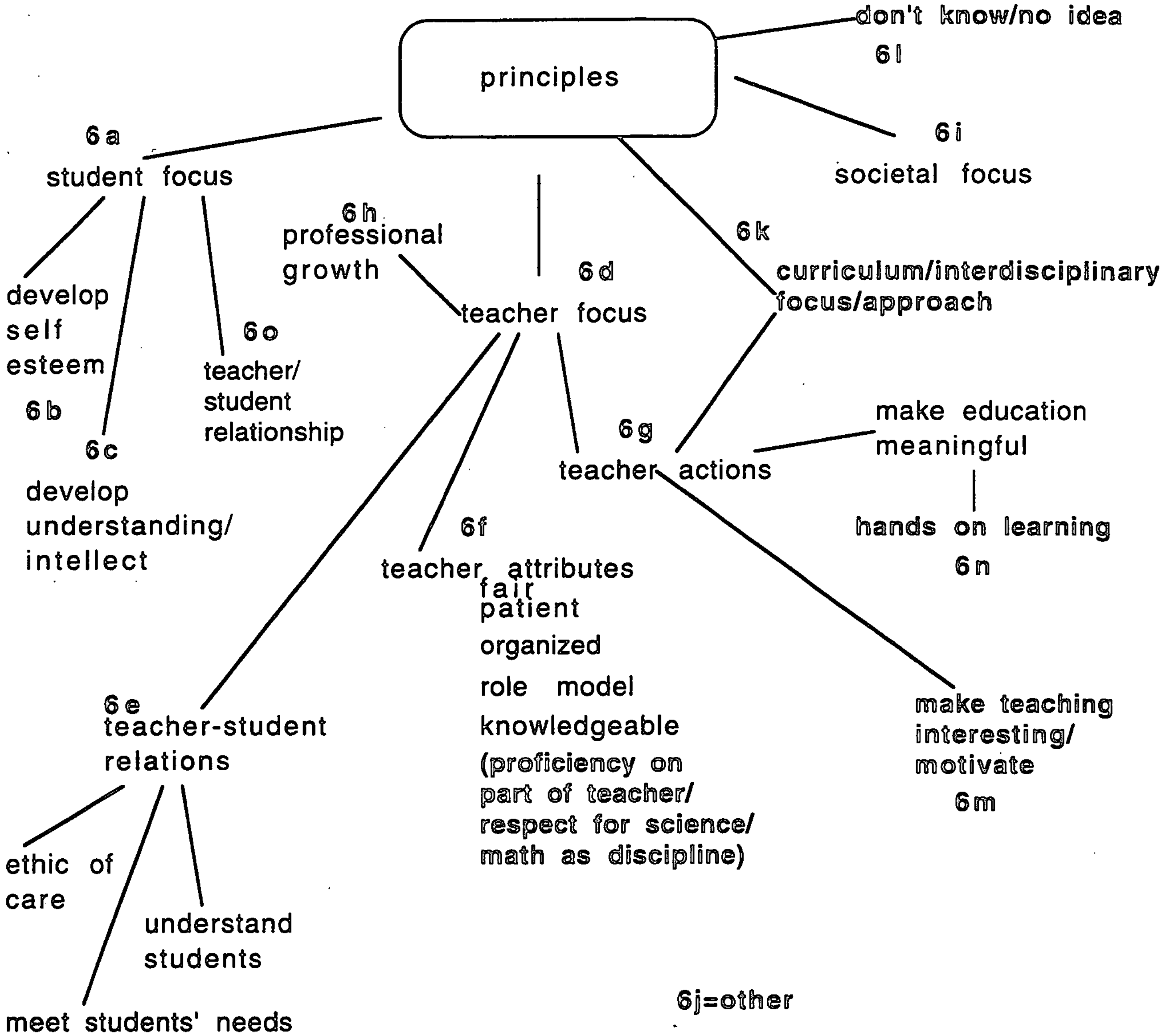


"Critical incidences"

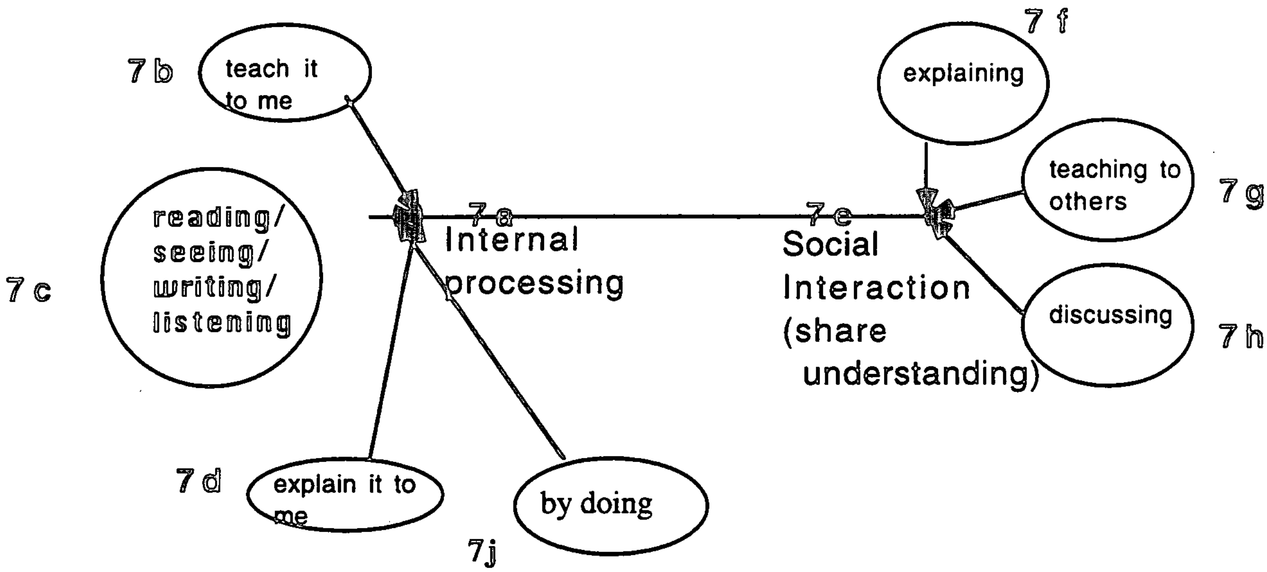


4m=other

6. What do you consider to be the founding principles of teaching?

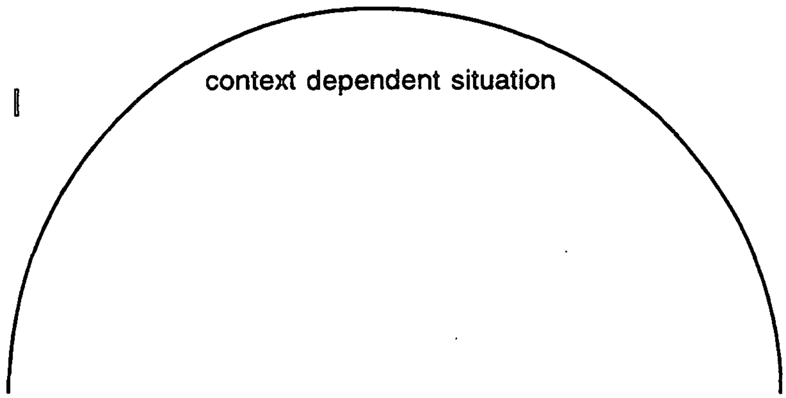


Q. 7. How do you learn best?



7i=other
i.e., relaxed environment
trial & error, ways not taught
7k=I don't know
7m=lectures

Q. 8. How do you know when you have learned?



Internal test
(intrapersonal)
8 a

8 j when use knowledge as tool/ use knowledge to create

8 k have AHA! phenonenon (light bulb)

8m metacognitive function

social test 8 b
(interpersonal)

- -vanity or tests 8 c
- -formal or informal assessments 8 d
- -hold conversation 8 e
- -ask questions 8 f
- -explain it 8 g
- -teach 8 h

8l=other

Q. 9 HOW DO YOU KNOW WHEN YOU KNOW SOMETHING?

9 a
Internal Aspect

intrapersonal
recall/memorize
feel good about it
do it on my own
makes sense to me
aware of knowledge
justify it
comfortable with it

9 b
Social Aspect

interpersonal
explain to others
others agree with me
explanations understood

9 c
Scientific rationalism

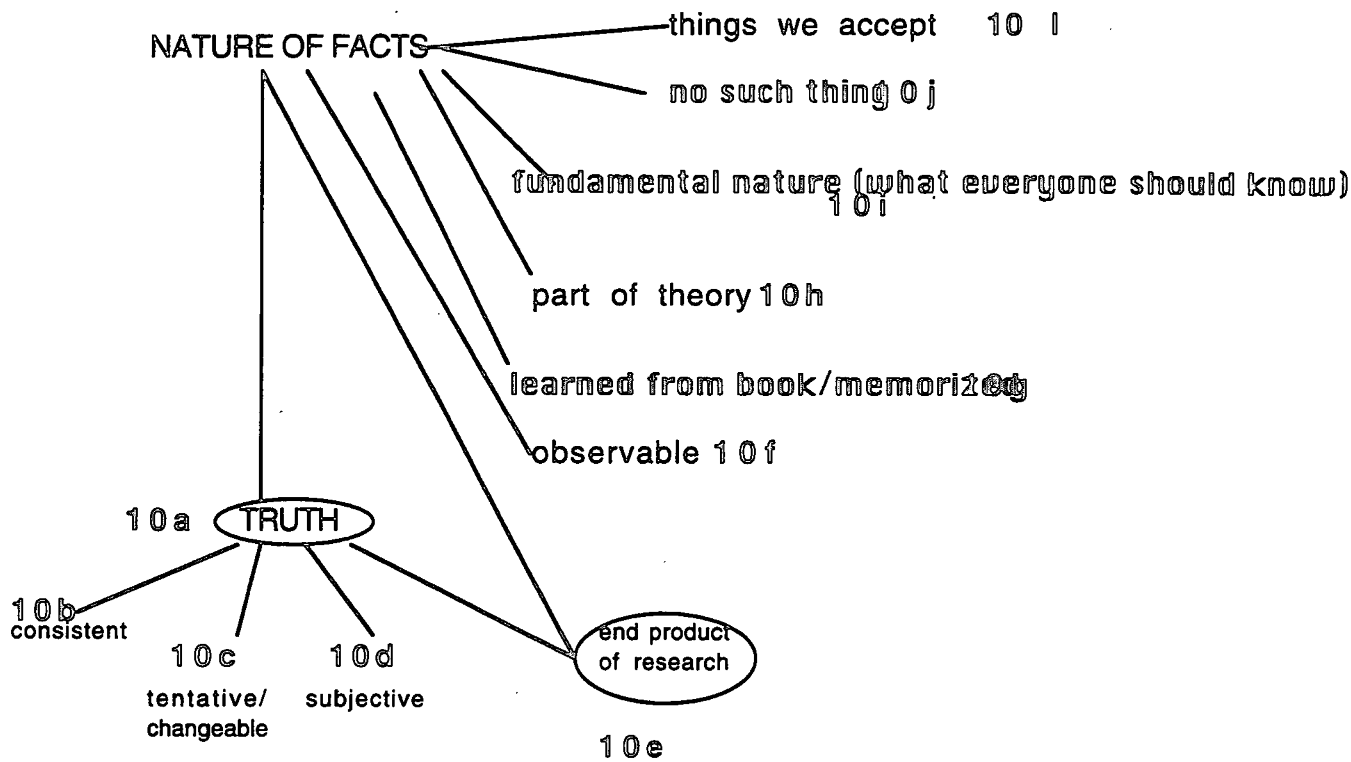
test it to see if true
use proof

9 d
Learning related to knowing

no difference between them
(learning = knowing)

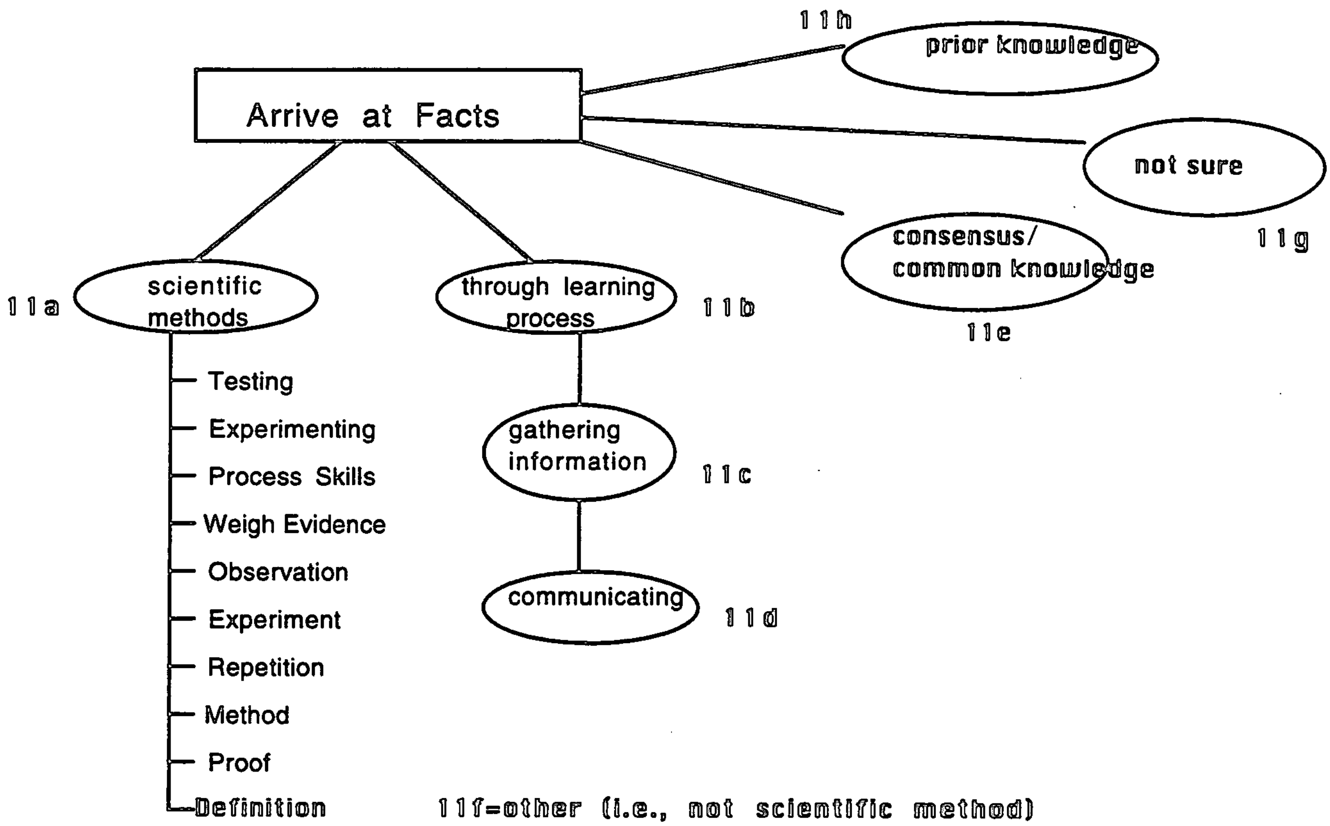
9e=other

Q. 10. WHAT ARE FACTS?



10k=other

Q. 11. How are facts arrived at?



12. HOW DO YOU DISTINGUISH AMONG FACTS, LAWS, AND THEORIES IN SCIENCE/MATHEMATICS?

Facts

- 12a -observable
- 12b -basic
- 12c -truth
- 12d -accepted by everyone
- 12e -tentative/changeable
- 12f -subjective
- 12g -memorized/learned from book
- 12h -no such thing

Laws

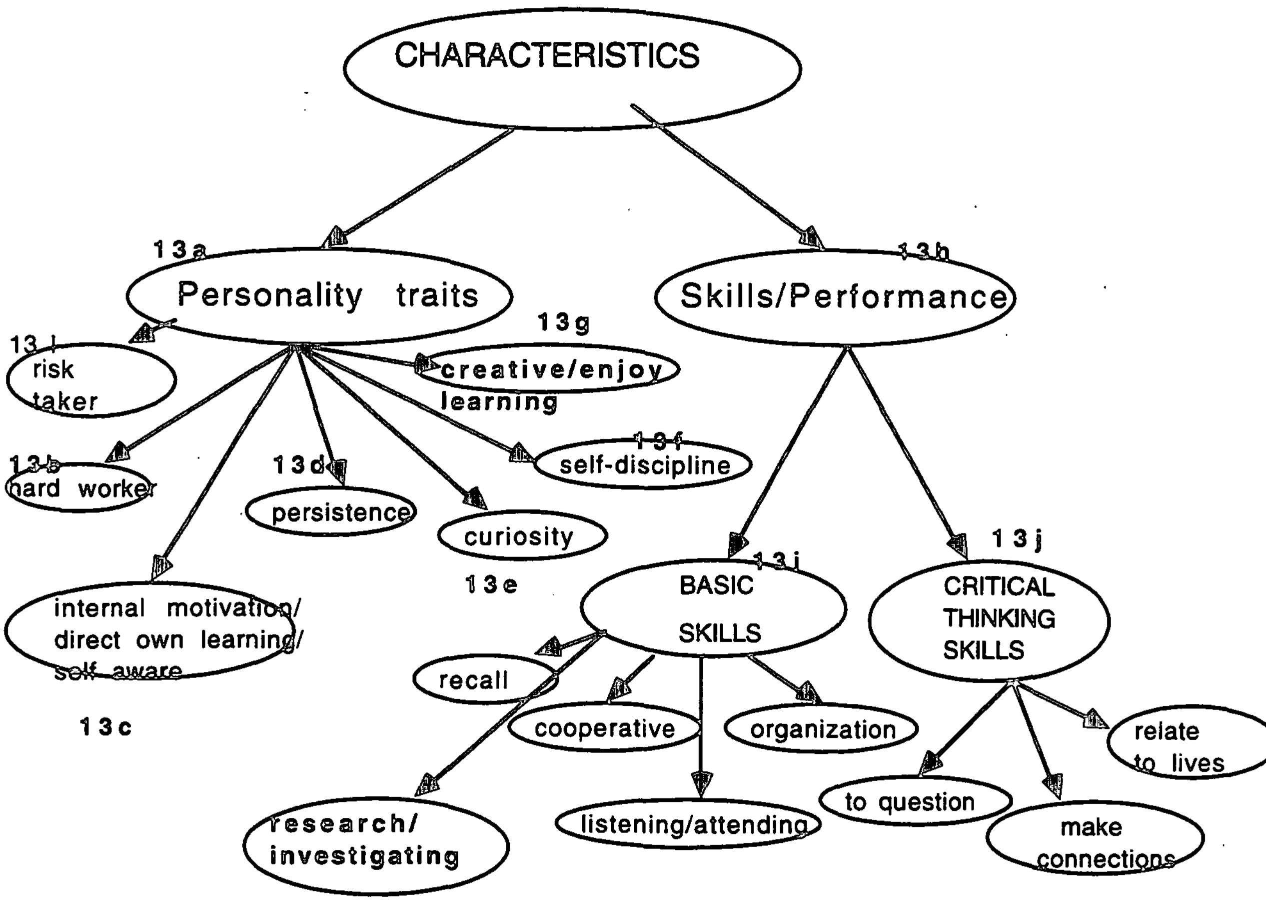
- 12i -equations describing the way the universe behaves
- 12j -rules & regulations that always hold
- 12k -principles
- 12l -absolute

Theories

- 12m -accepted principles
- 12n -reasons why
- 12o hypothesis-not conclusive
- 12p -tentative
- 12q -explain/predict

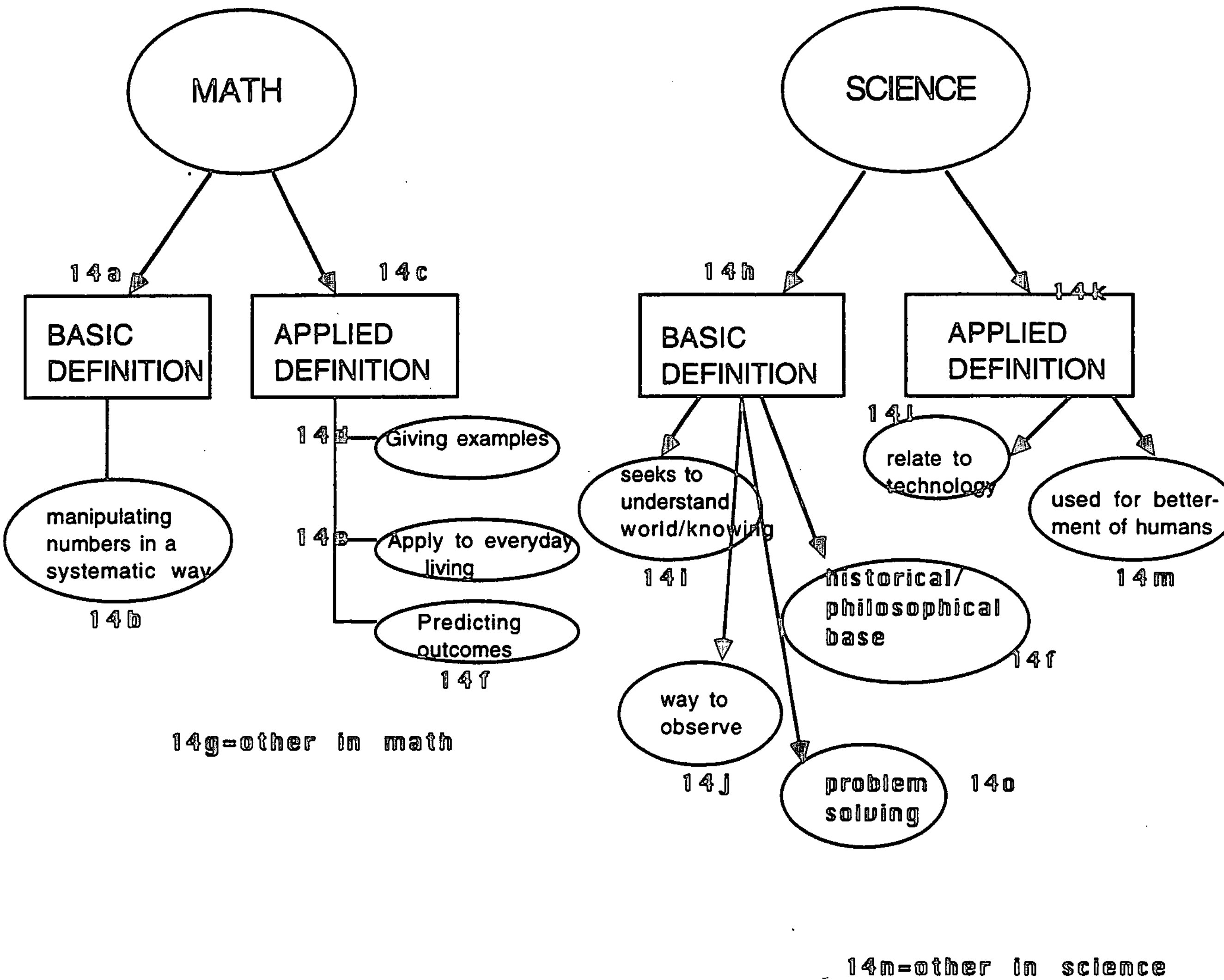
12r=other

Q. 13. When you picture a good learner in your mind, what characteristics of that person lead you to believe that they are a good learner?

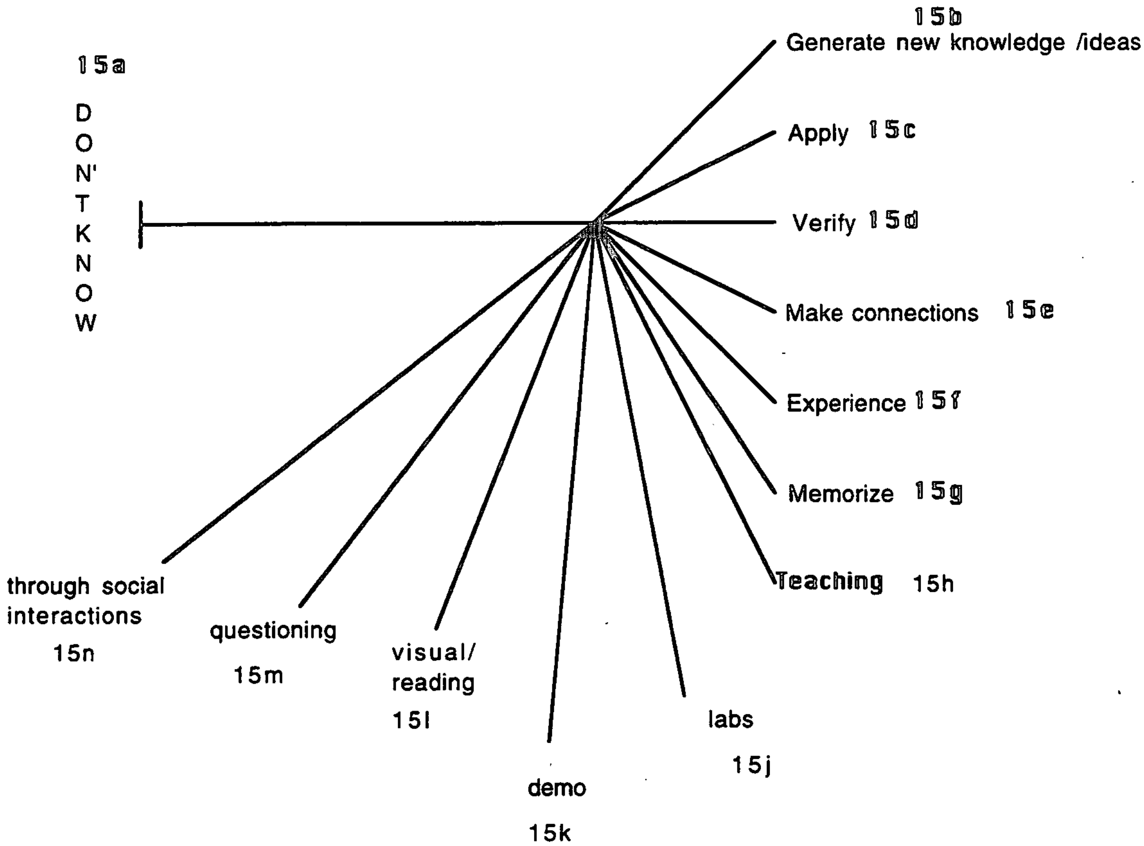


13k=other

Q. 14. WHAT IS MATH/SCIENCE?



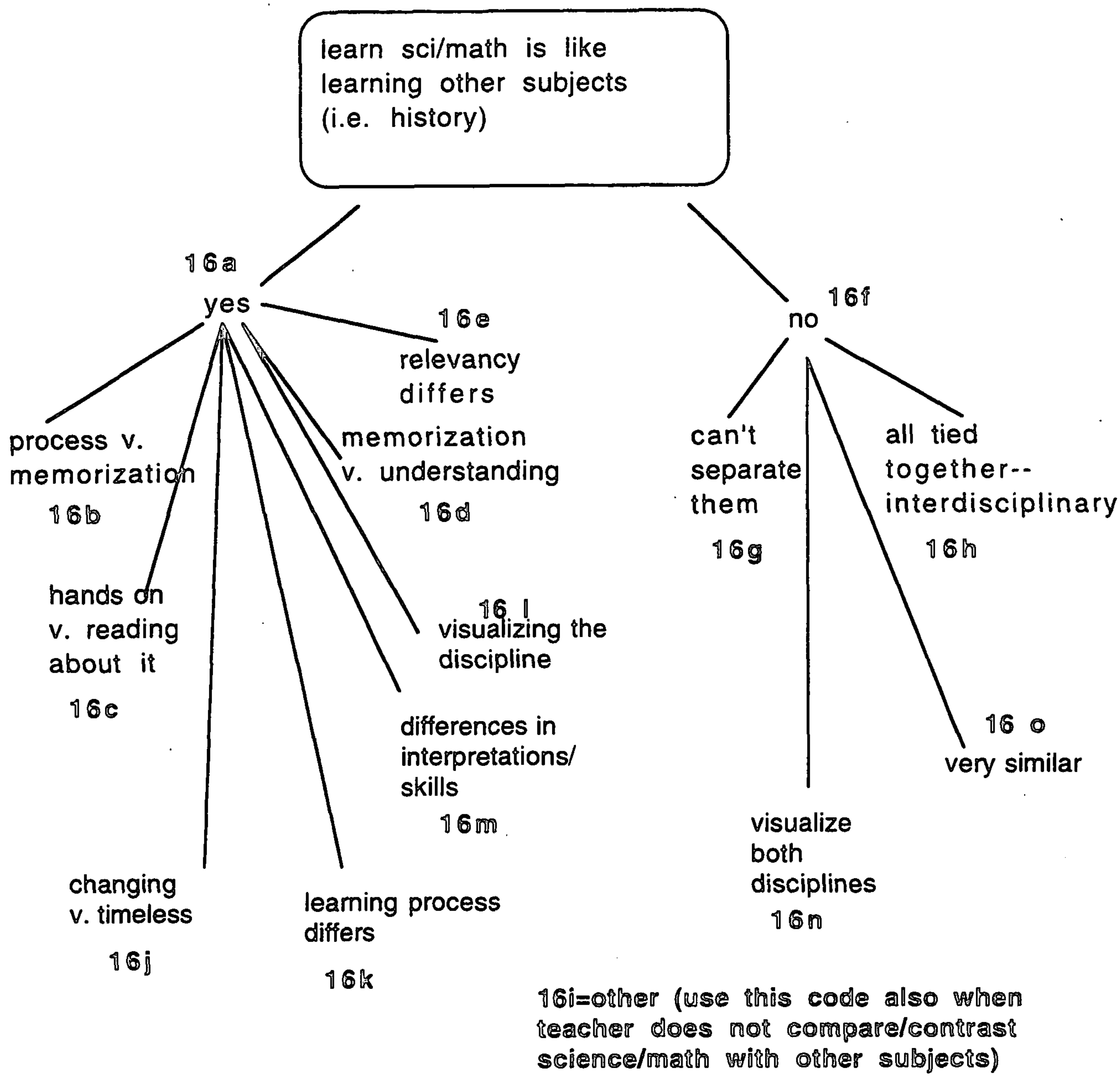
Q. 15. In what ways do you learn science/math best?.



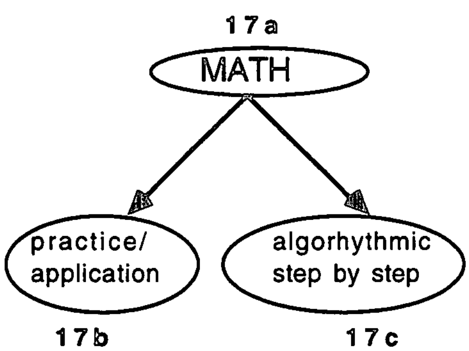
15i=other

86

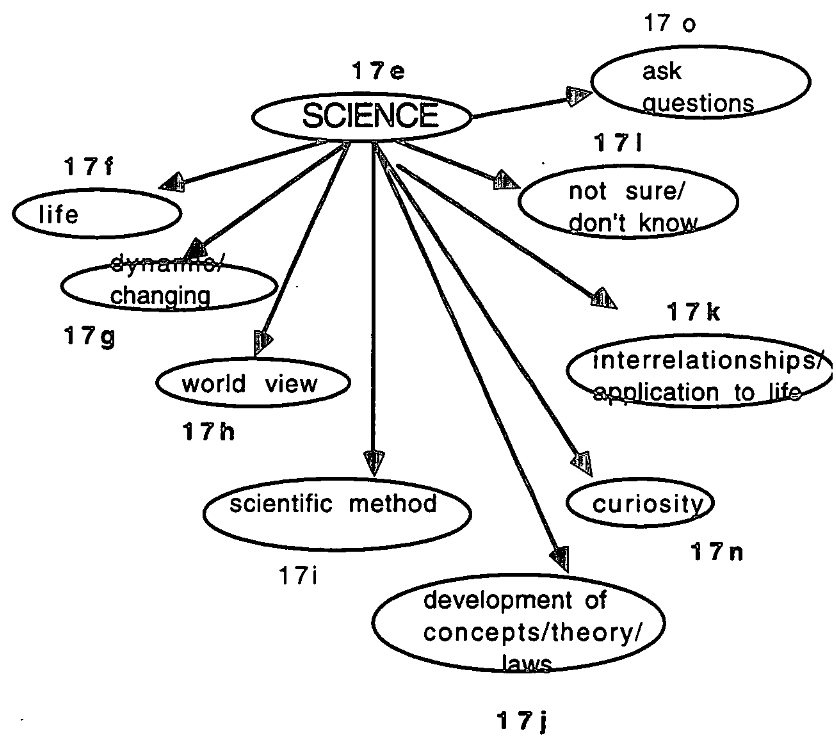
16. When you learn science/math, is it different than learning math/science or history?



Q. 17. What are founding principles of math (science)?

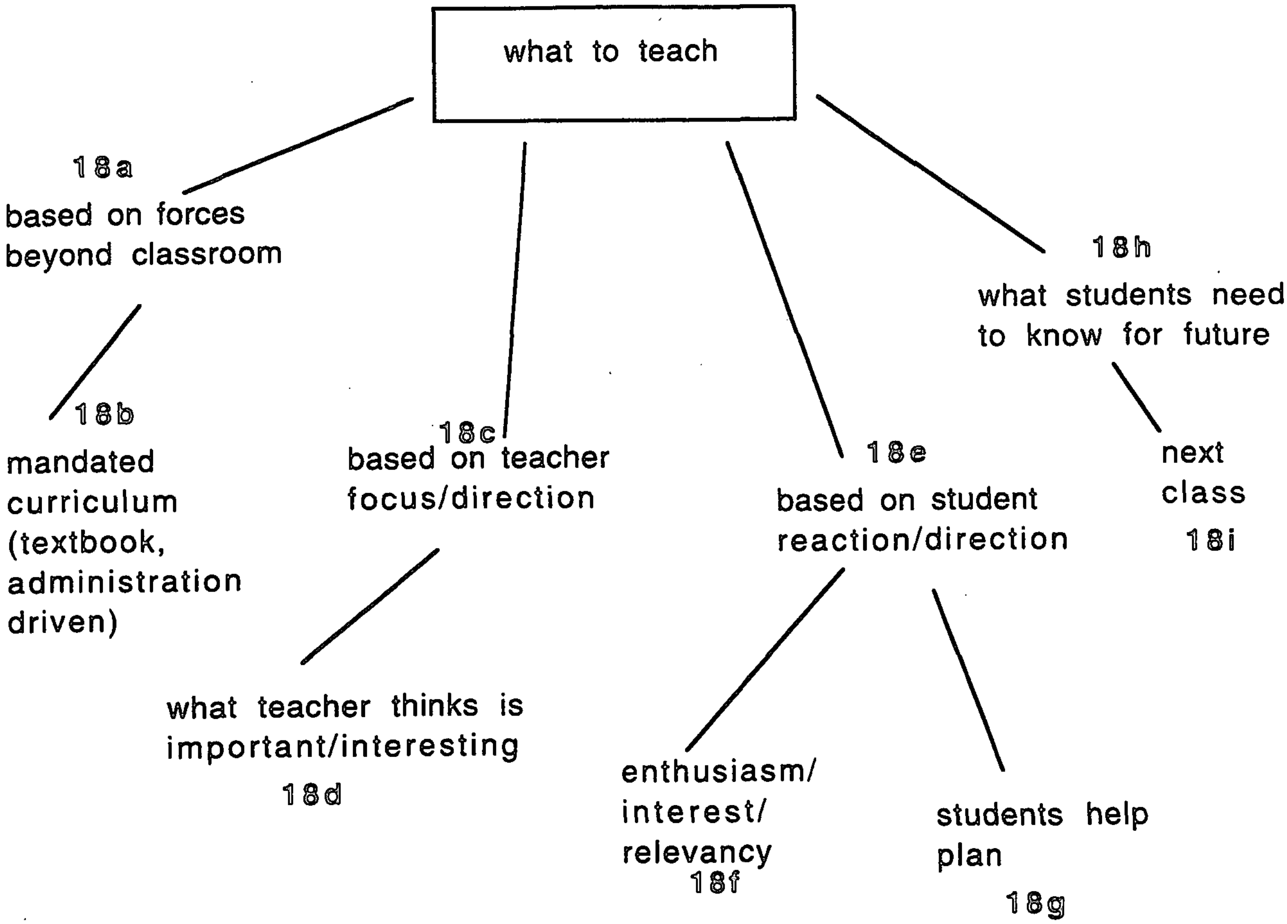


17d=other in math



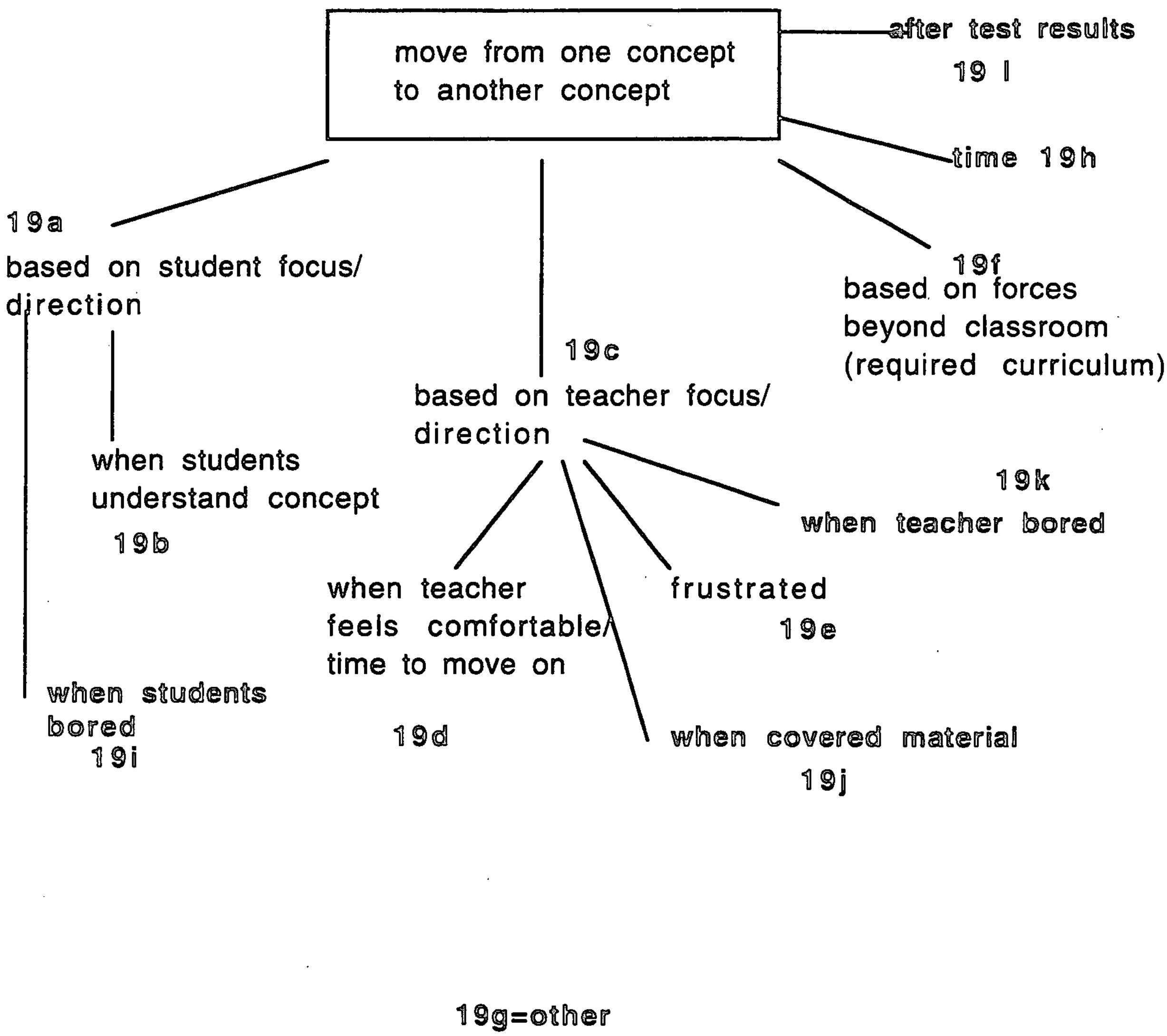
17m=other in science

18. How do you decide what to teach and what not to teach?

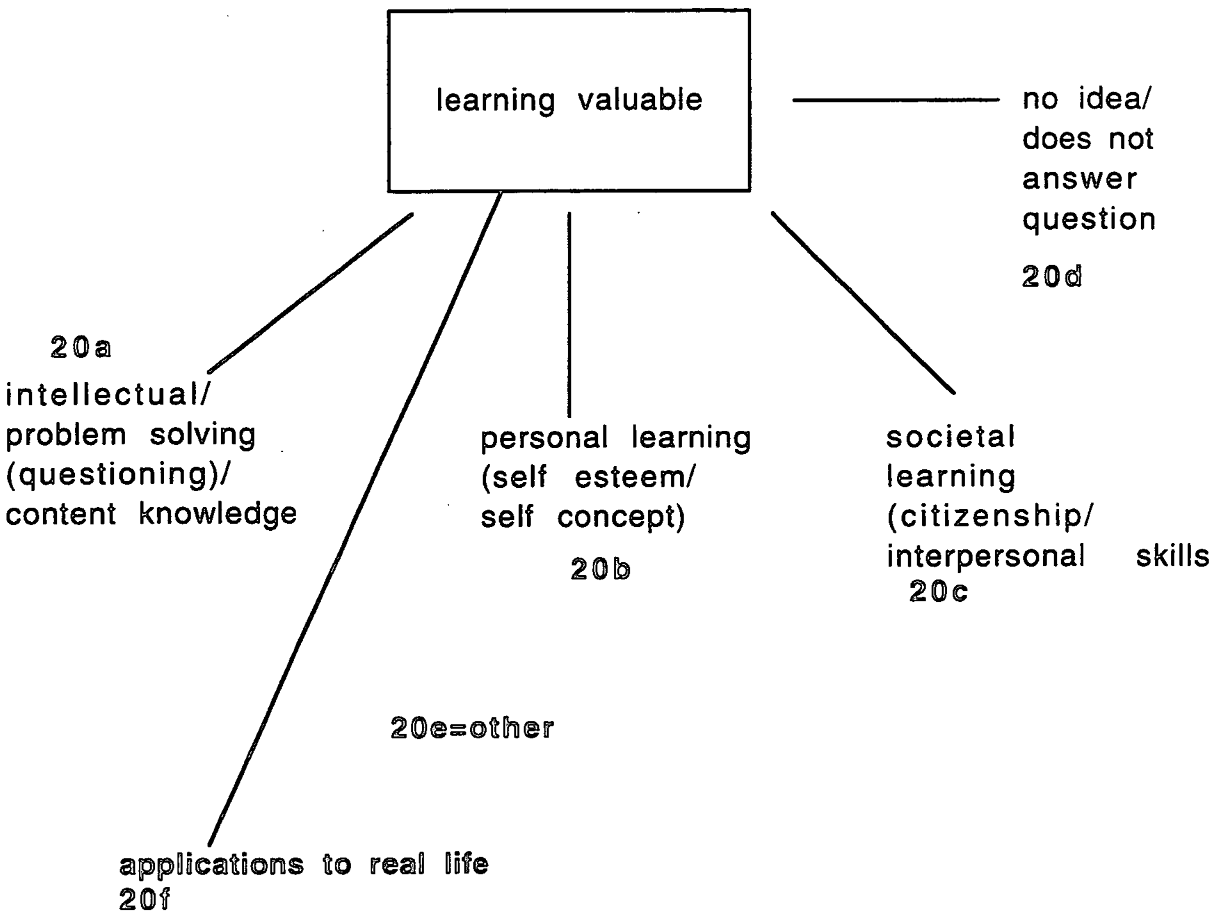


18j=other

19. How do you decide when to move from one concept to another?

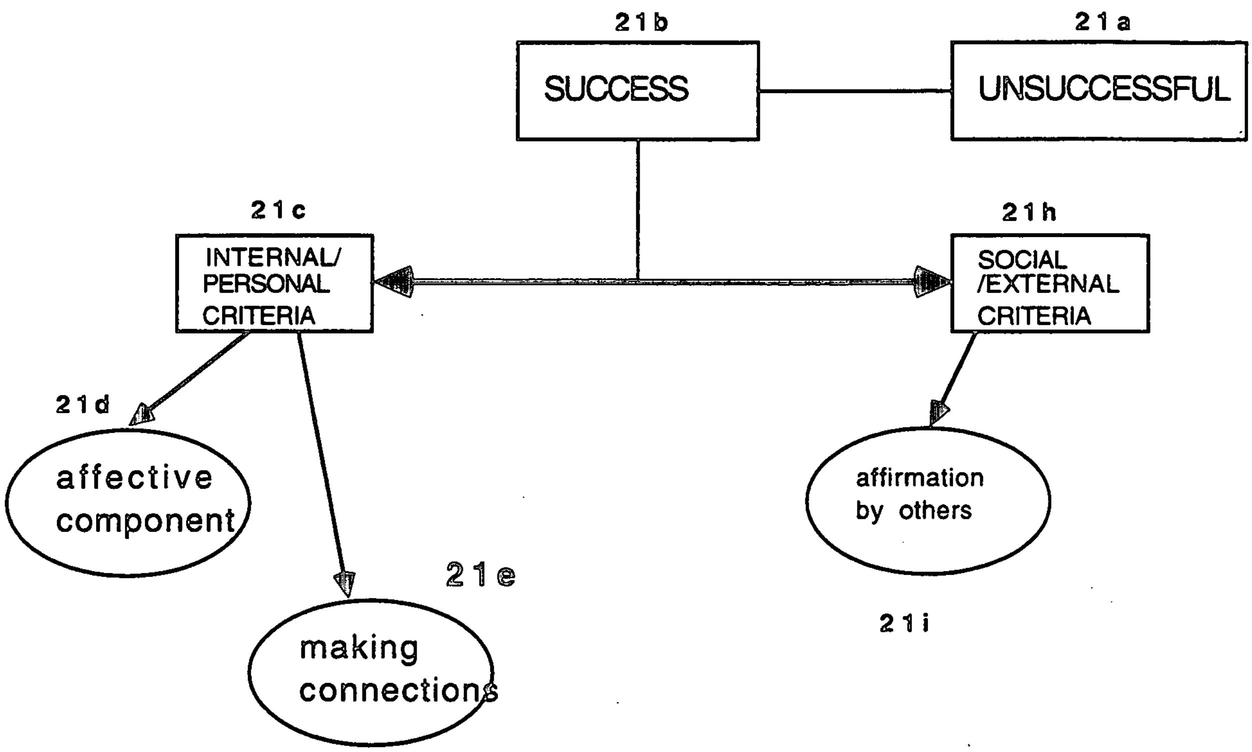


20. What learning in your classroom do you think will be valuable to your students outside the classroom environment?



Q. 21. Describe the best teaching/learning situation that you have ever experienced.

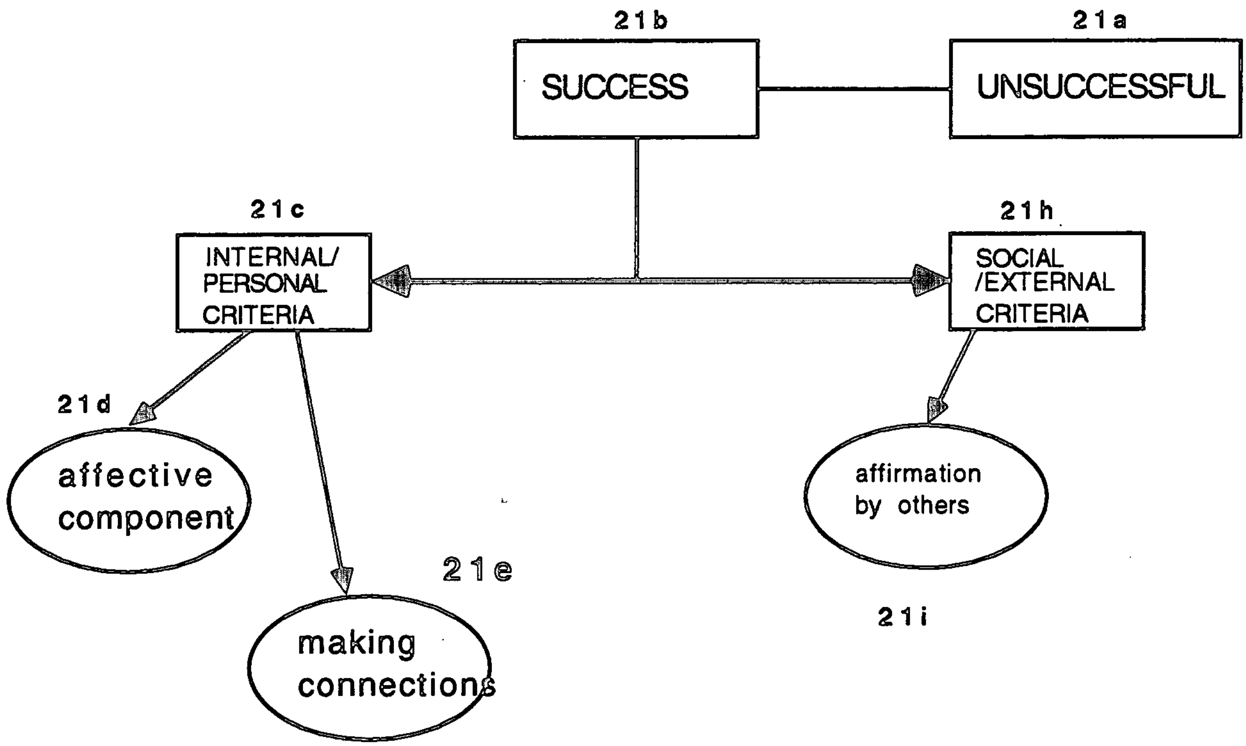
Identify with a learning situation.



21s=other

Q. 21. Describe the best teaching/learning situation that you have ever experienced.

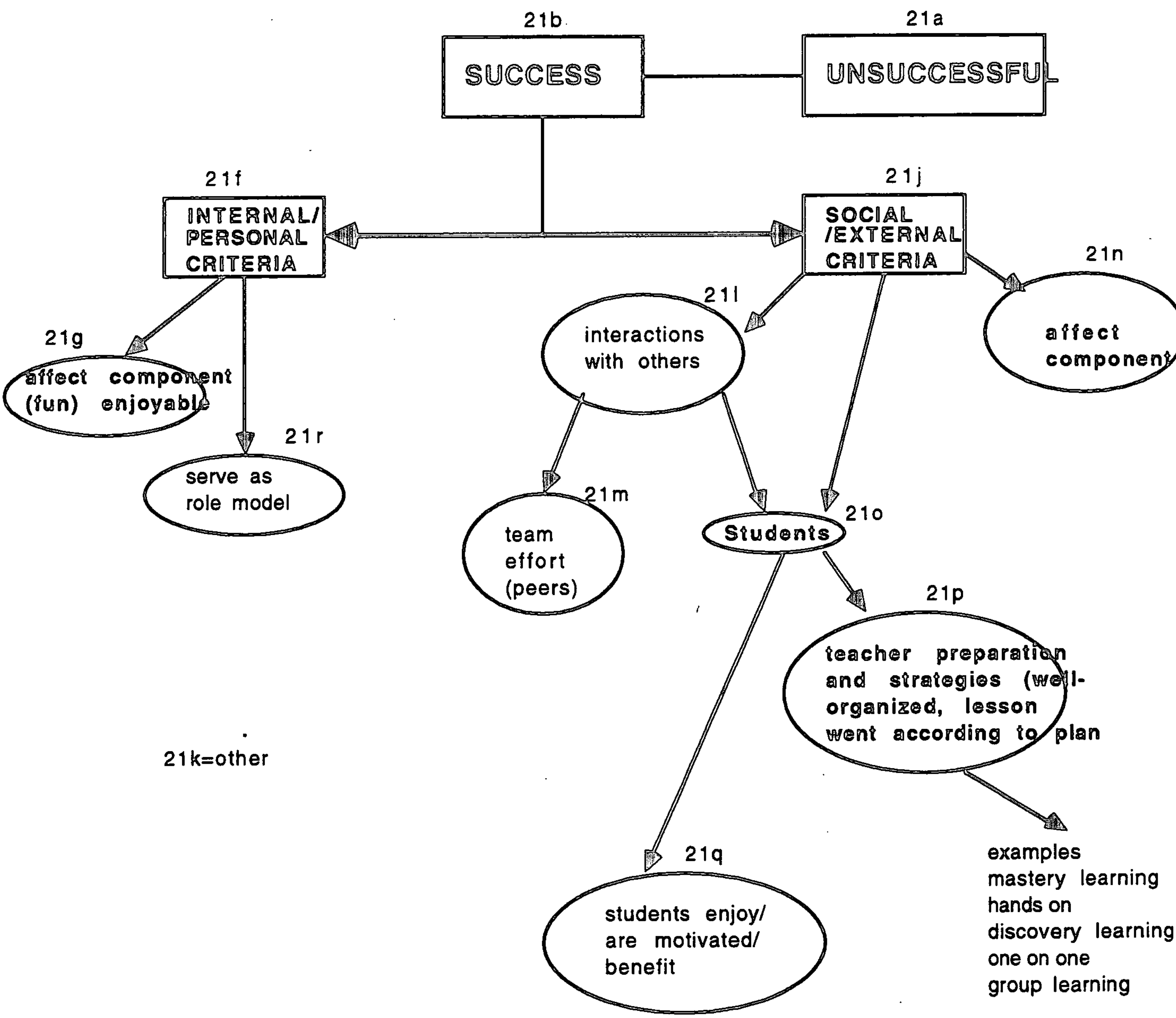
Identify with a learning situation.



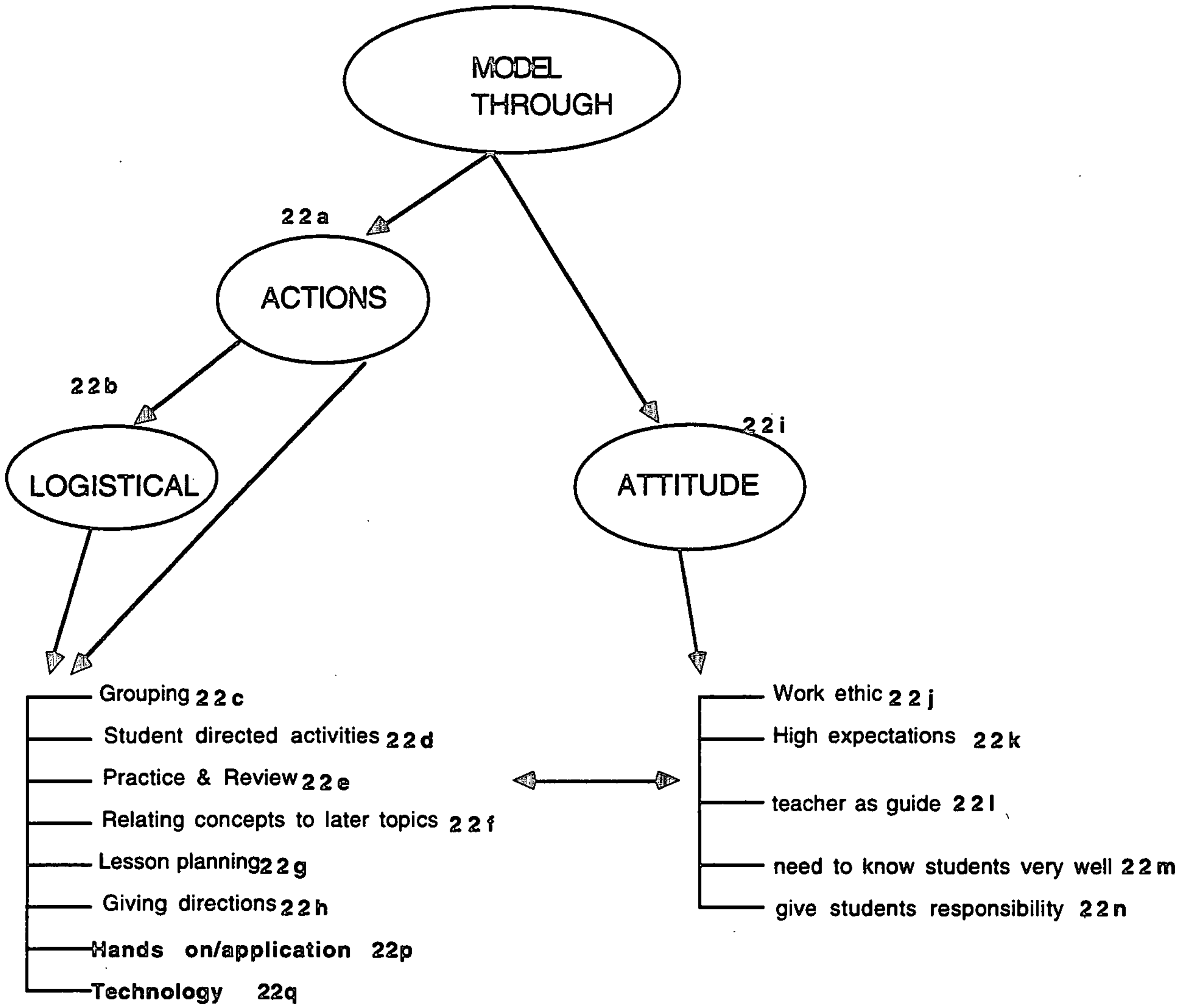
21s=other

Q. 21. Describe the best teaching/learning situation that you have ever experienced.

Identify with a teaching situation.

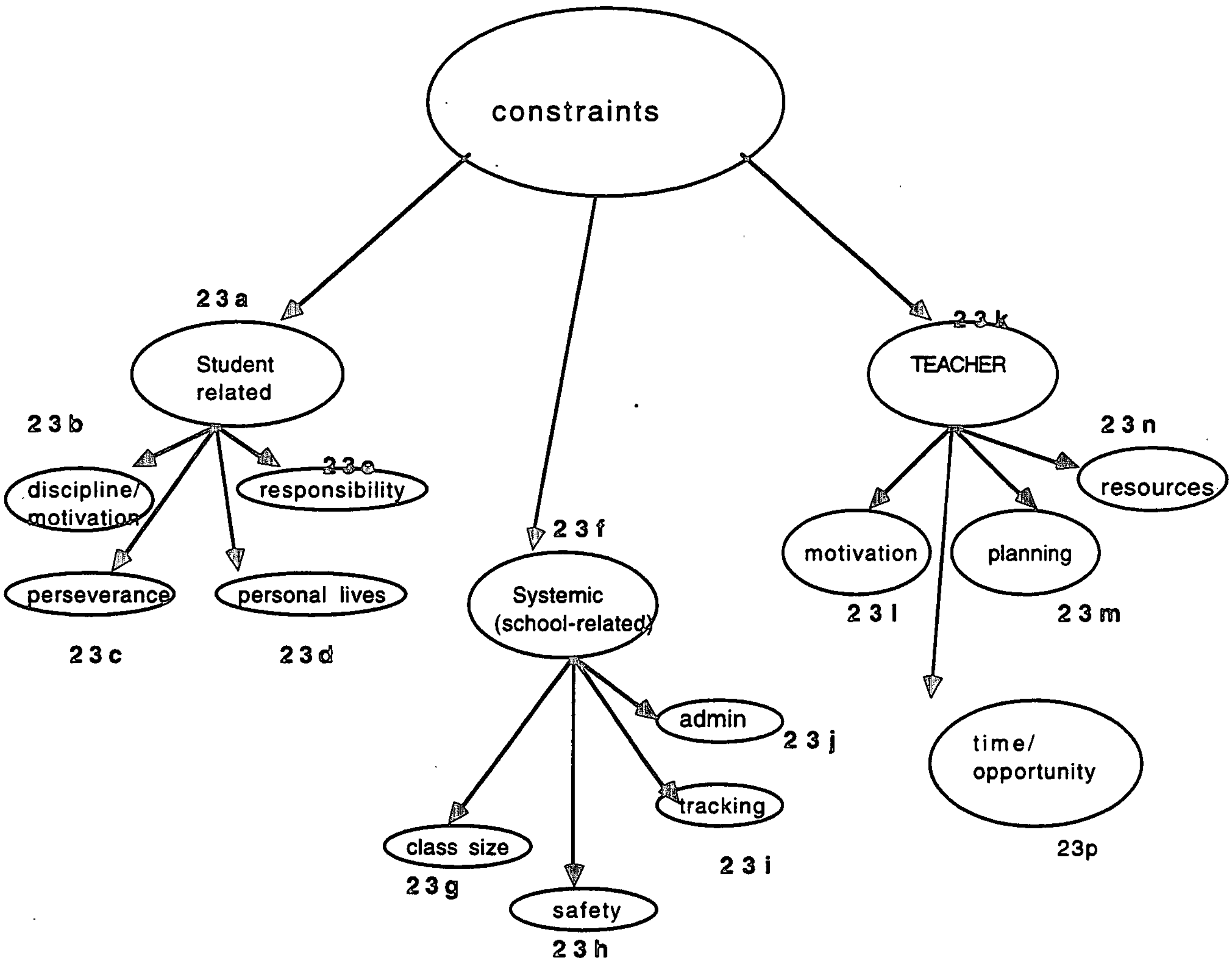


Q. 22. In what ways do you try to model the best teaching/ learning situation in your classroom?



22o=other (i.e., still forming model/no model)

Q. 23. What are some of the impediments or constraints in implementing that kind of model?



23o=other

Q. 24. What are some of the tactics you use to overcome these constraints?

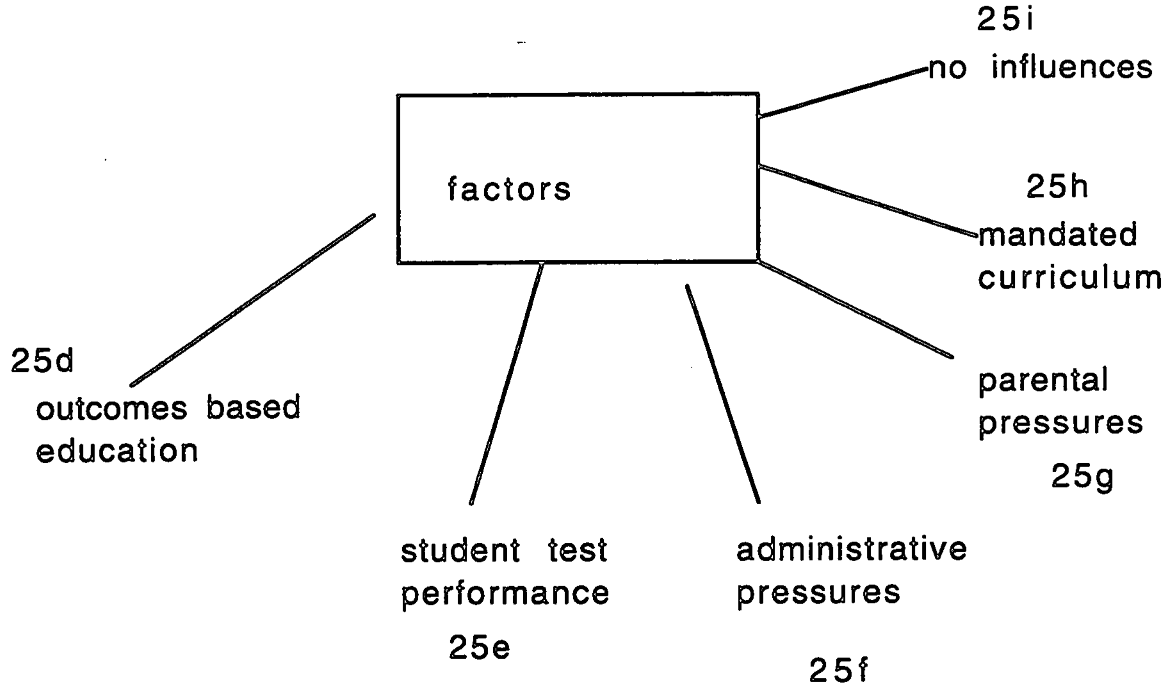
TACTICS

- Classroom management (ie., physical environment) 24a
- Empowerment/motivation of student 24b
- Alter instruction 24c
- none/no tactic 24e
- don't do it 24f

24d=other

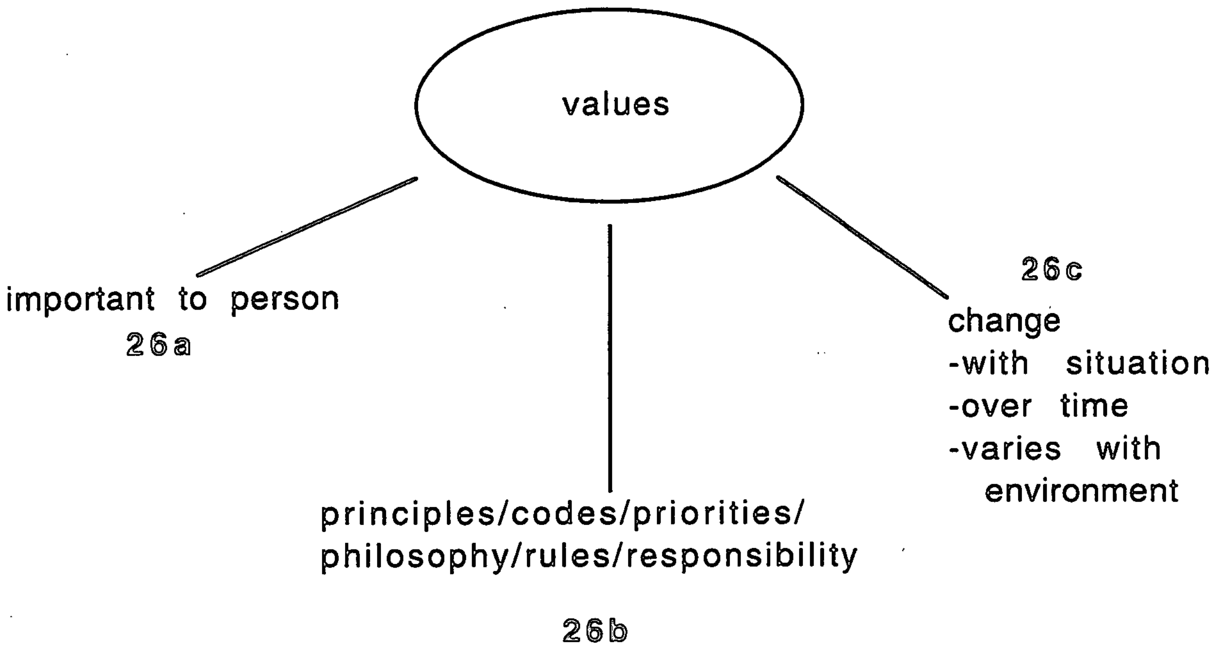
25. ARE THERE ANY THINGS AT THE LOCAL/SCHOOL/STATE LEVELS THAT INFLUENCE THE WAY YOU TEACH? WHAT ARE SOME EXAMPLES OF THIS?

Level
25a -local
25b -school district
25c -state



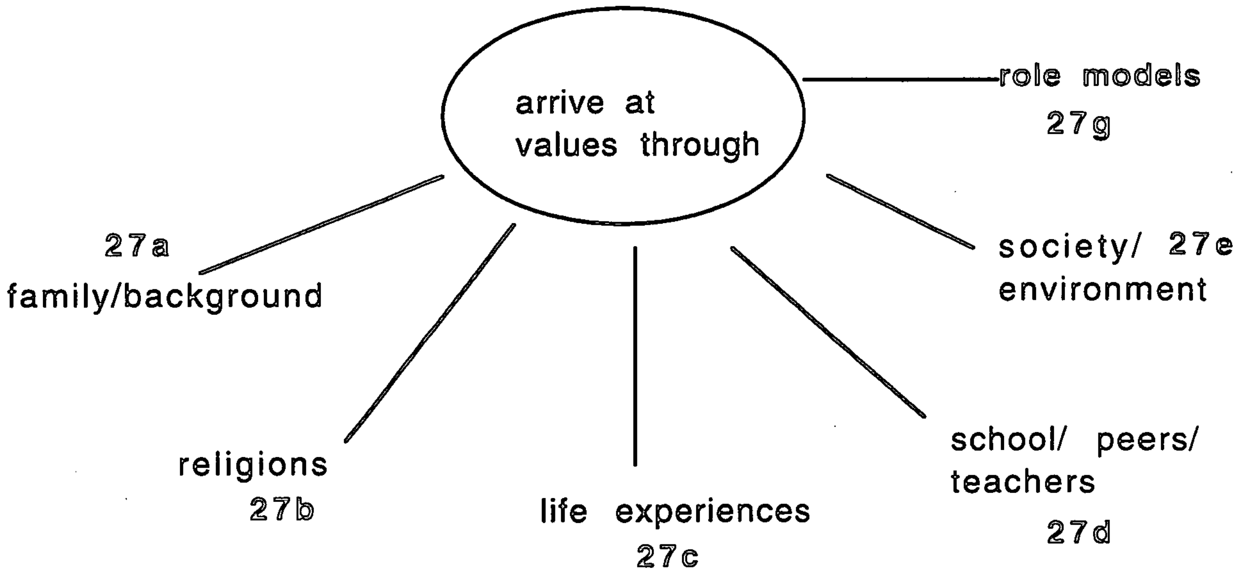
25j=other

26. What are values?



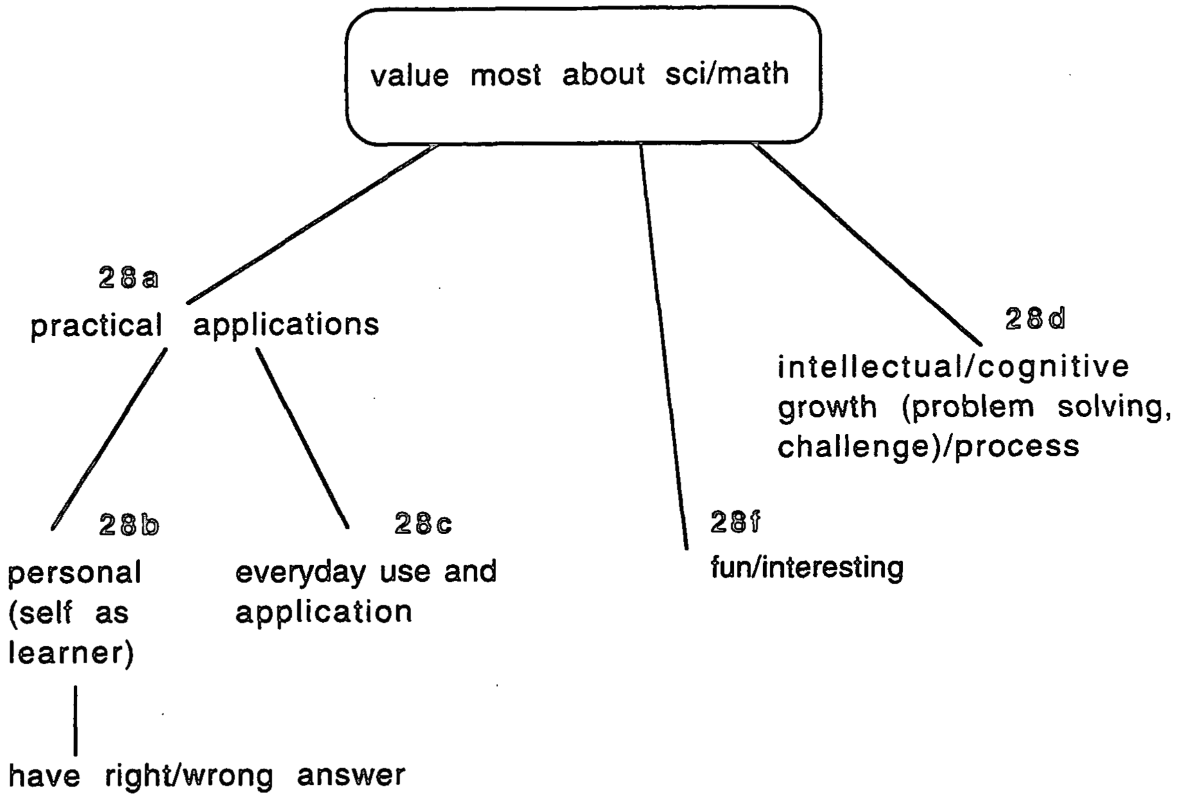
26d=other

27. How do you arrive at these values?



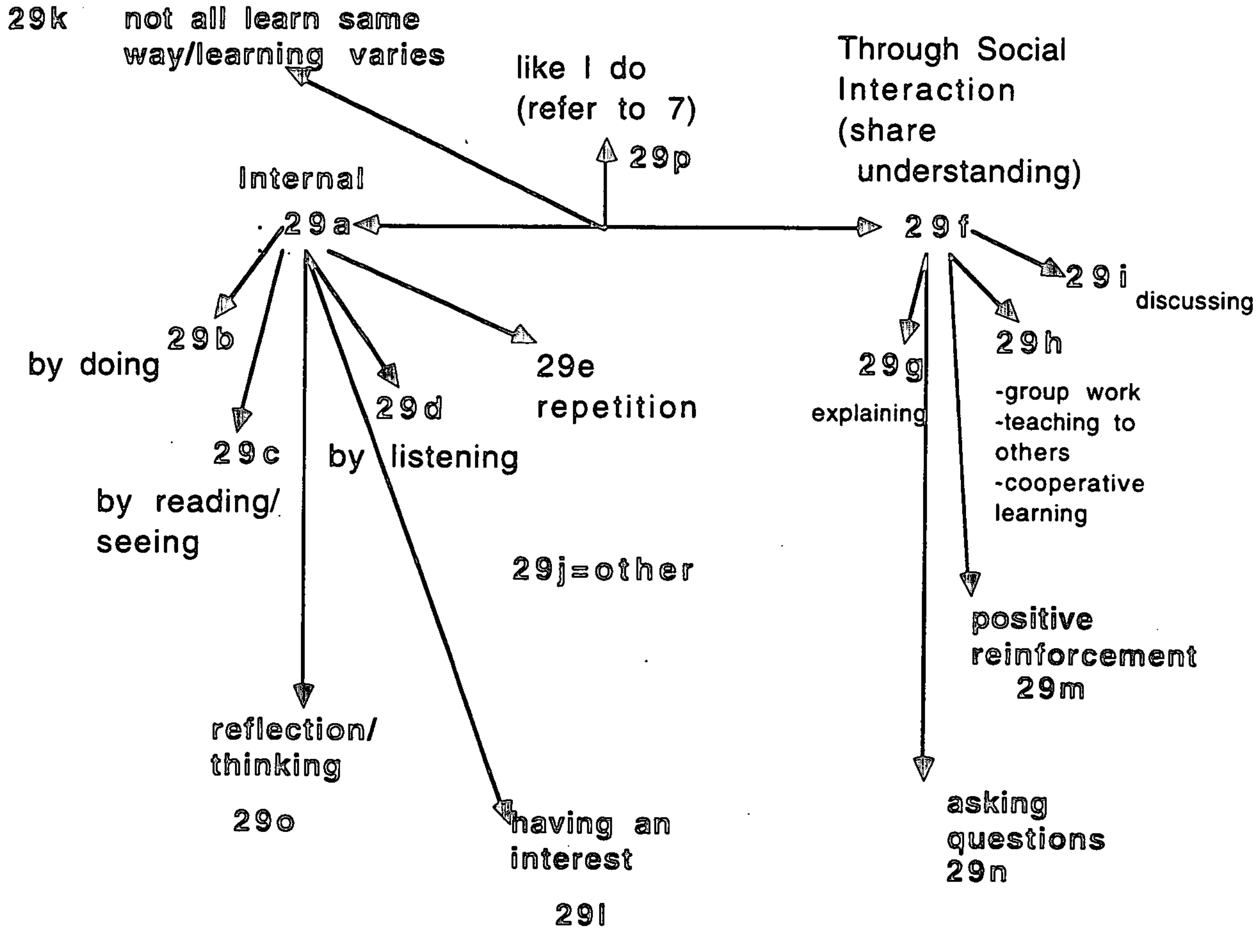
27f=other

28. What are some of the things you value most about science/math?

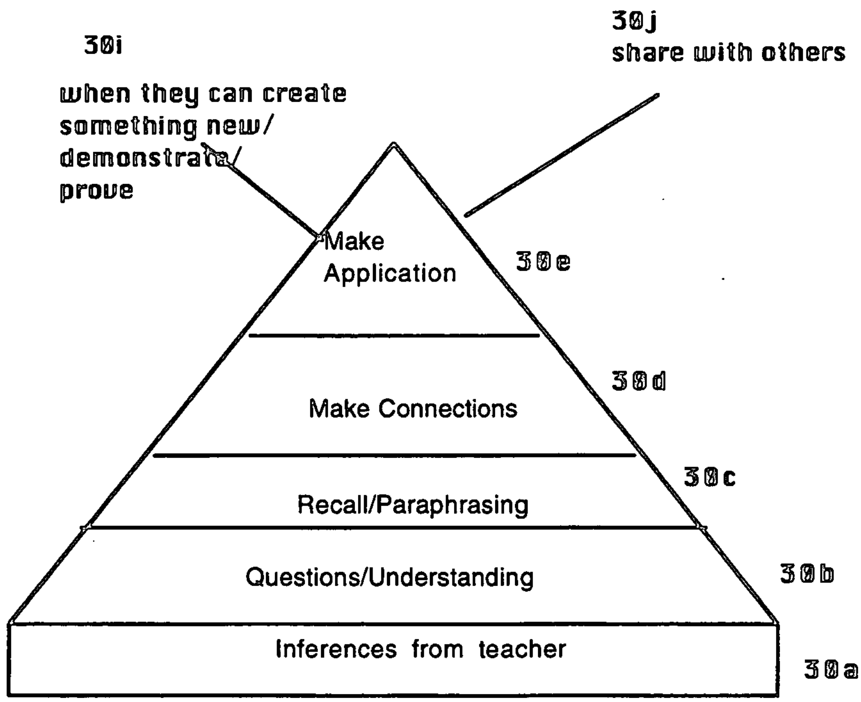


28e=other

Q. 29. How do your students learn best?



Q. 30. How do yo know when your students understand a concept?

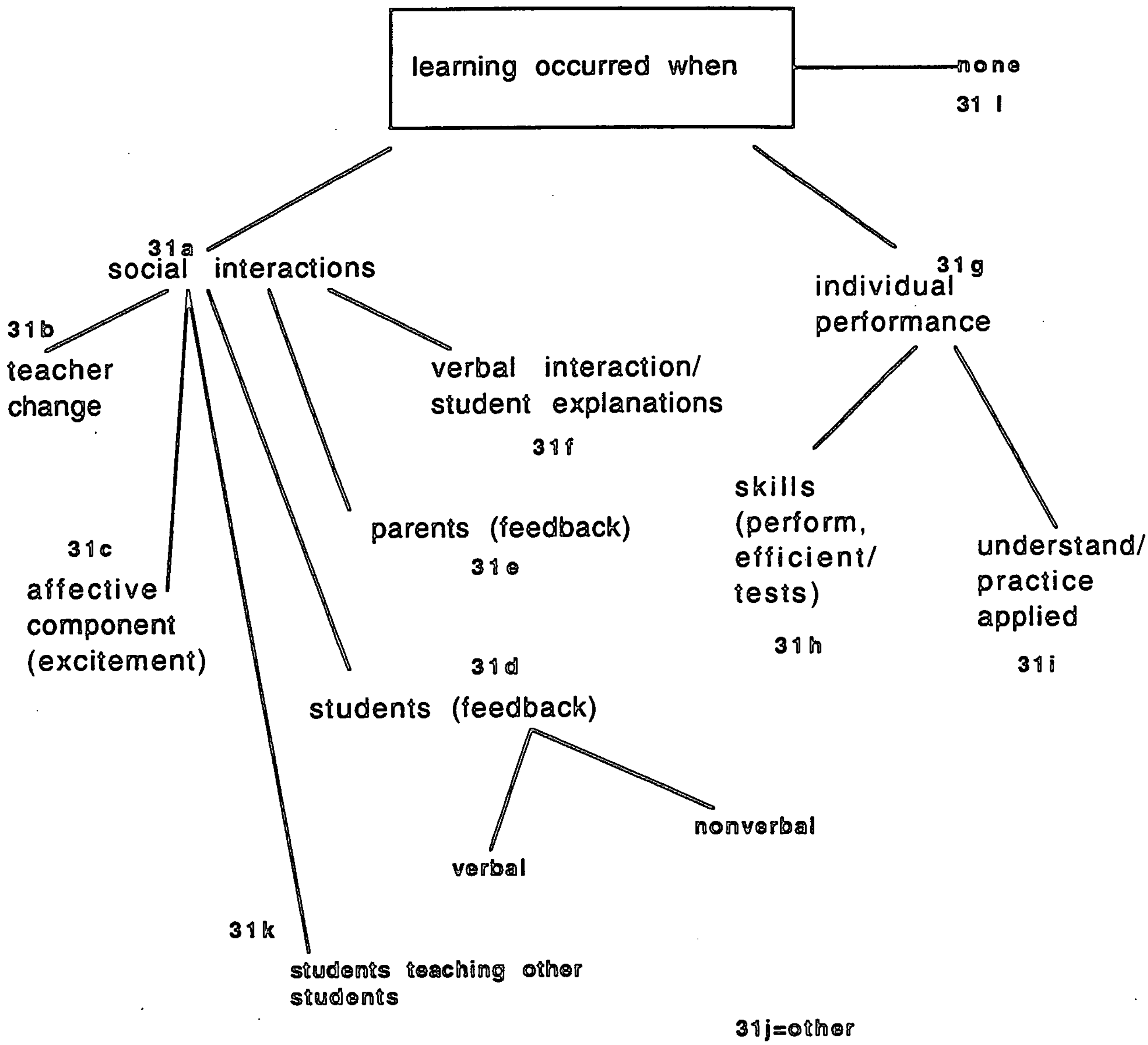


30f=other

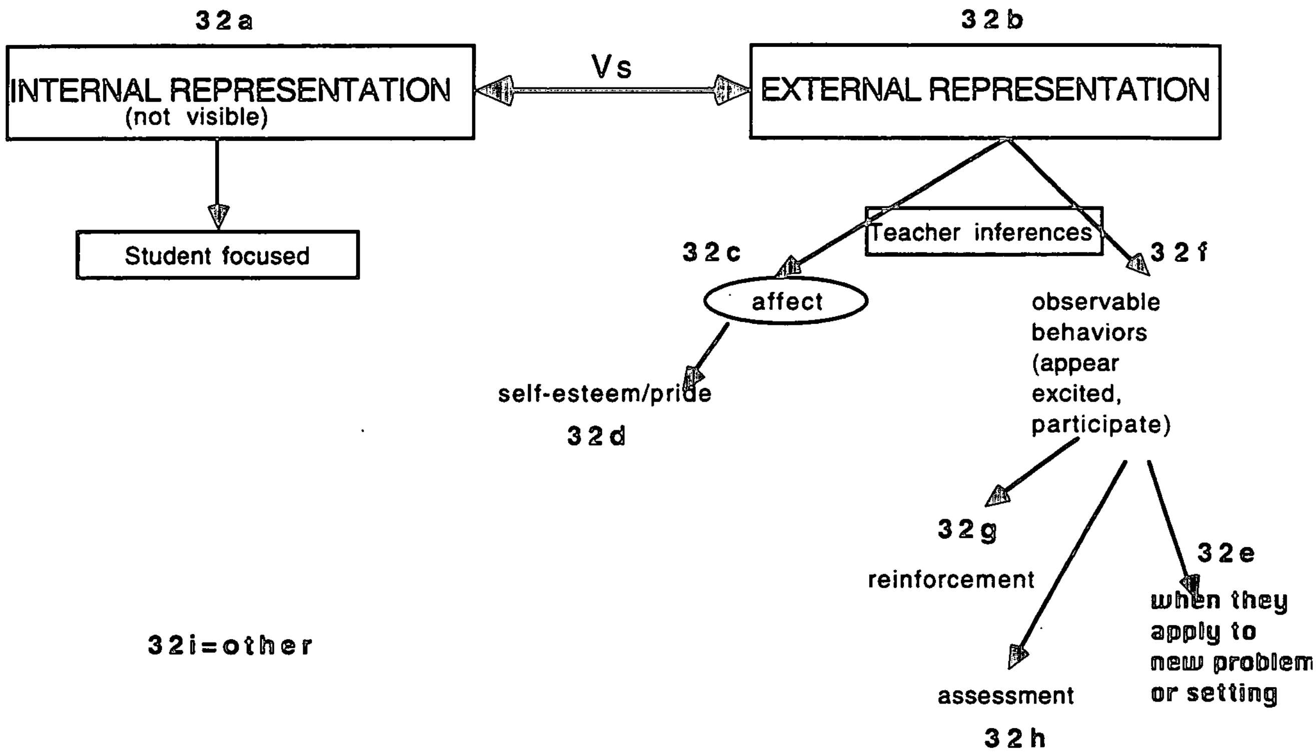
30g=when assessed through conversation

30h=when assessed with written test

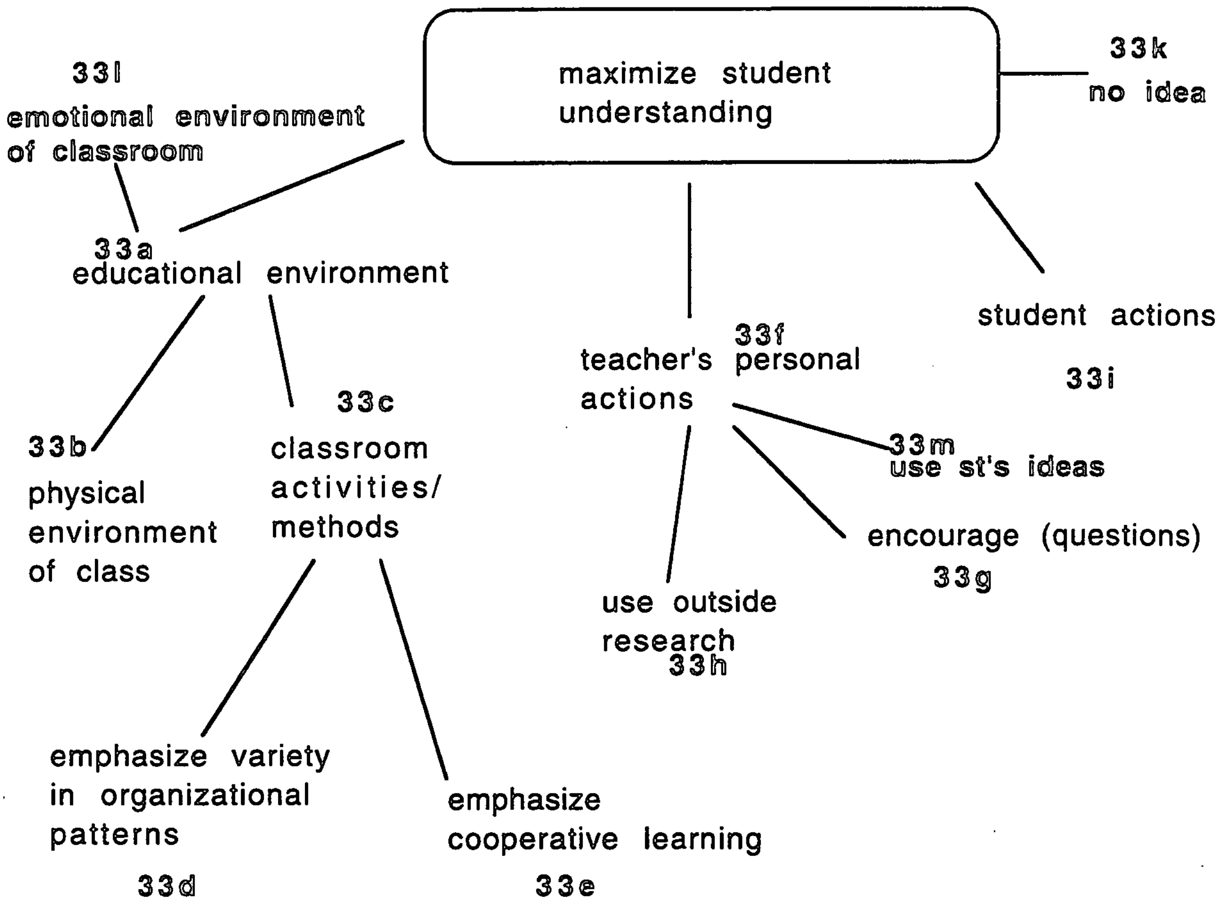
31. How do you know when learning is or has occurred in your classroom?



Q. 32. How do you think your students come to believe in their minds that they understand something?

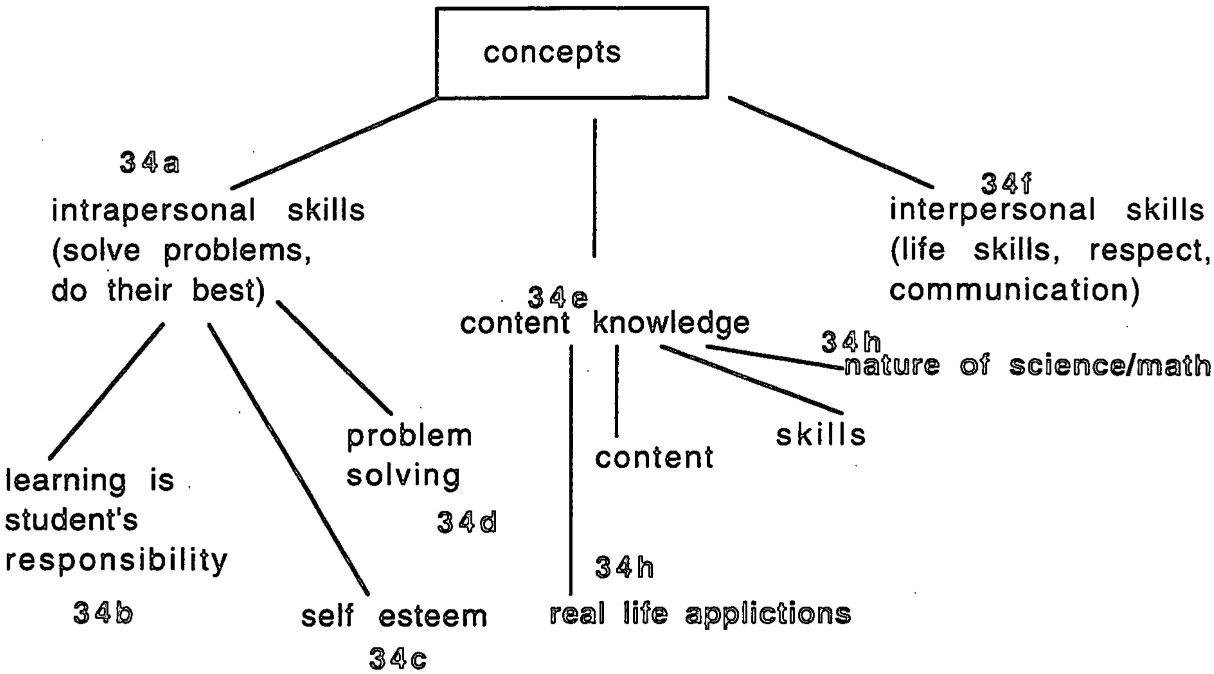


33. In what ways do you manipulate the educational environment to maximize student understanding?



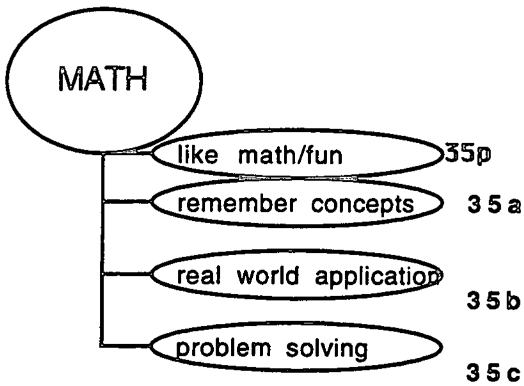
33j=other

34. What concepts do you believe are the most important for your students to understand by the end of the year?



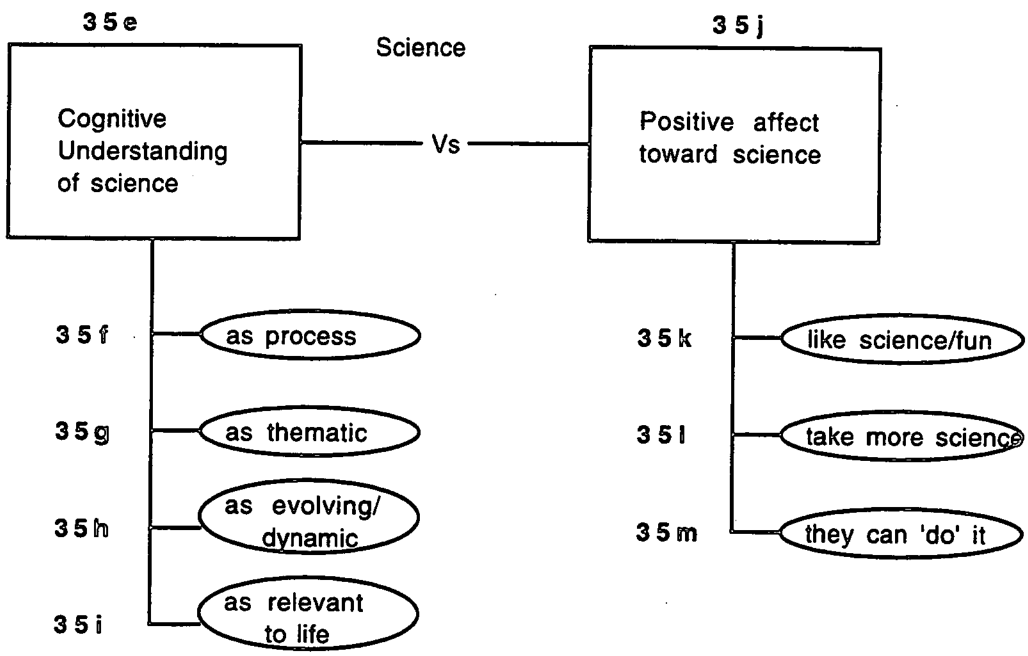
34g=other

Q. 35. How do you want your students to view math (science by the end of the school year?



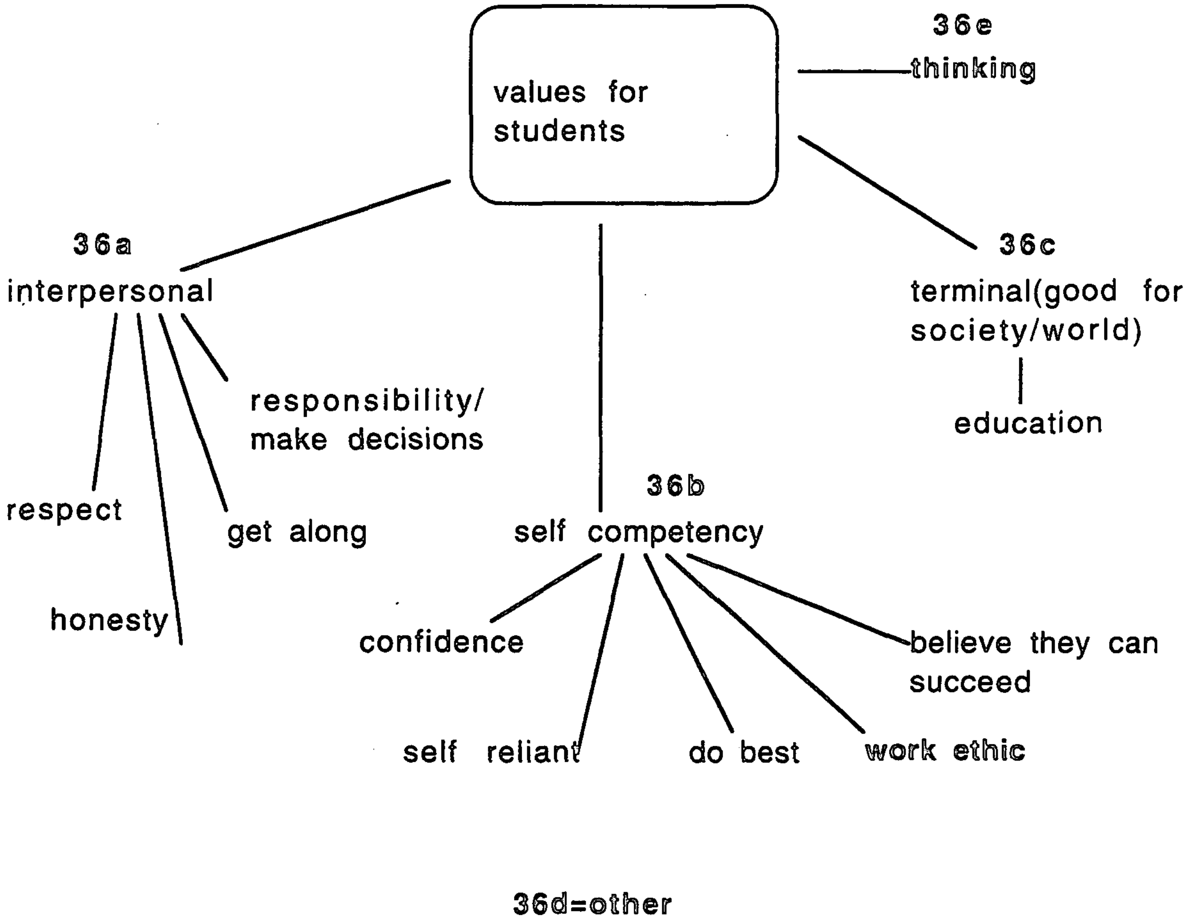
35d=other in math

35 o=can do if apply self

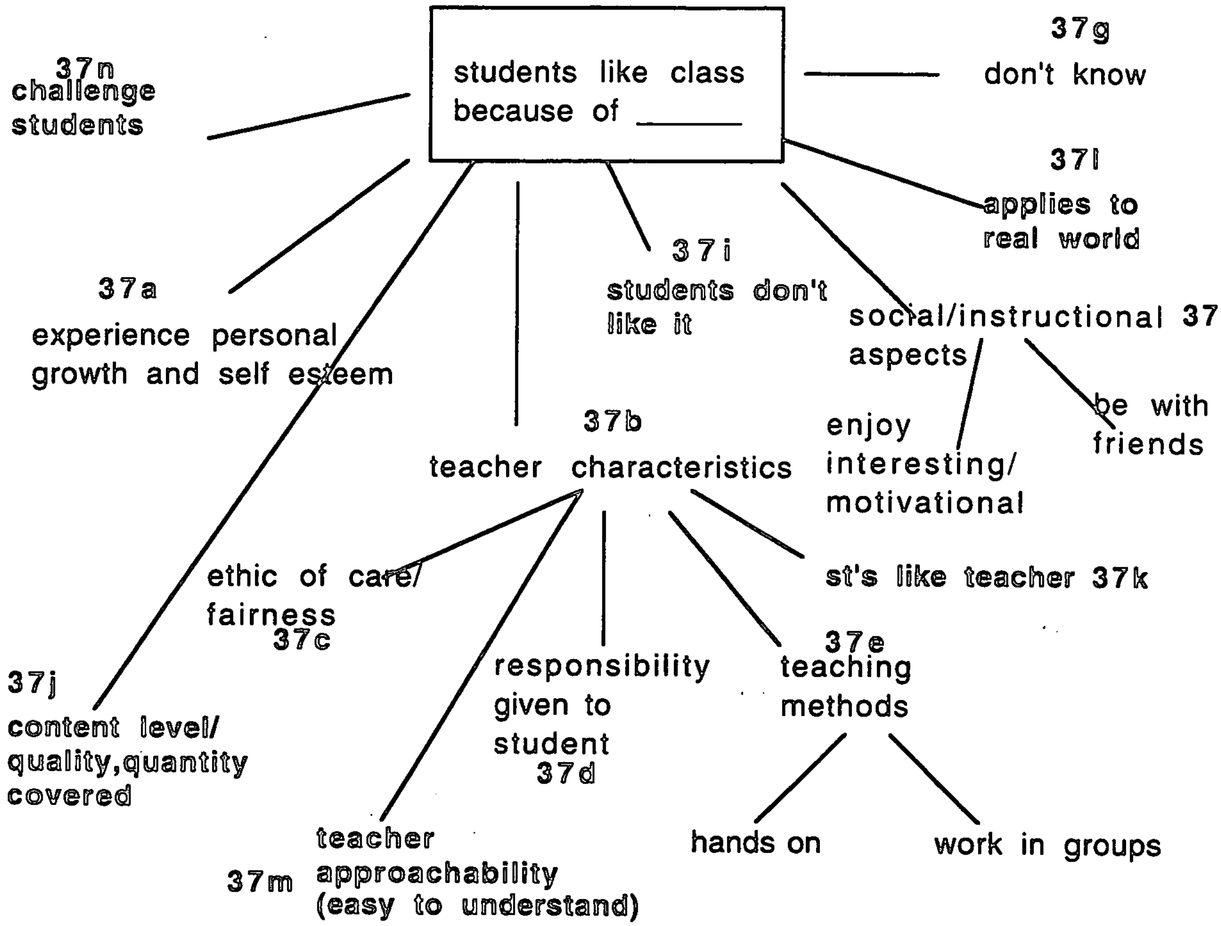


35n=other in science

36. What values do you want to develop in your students?

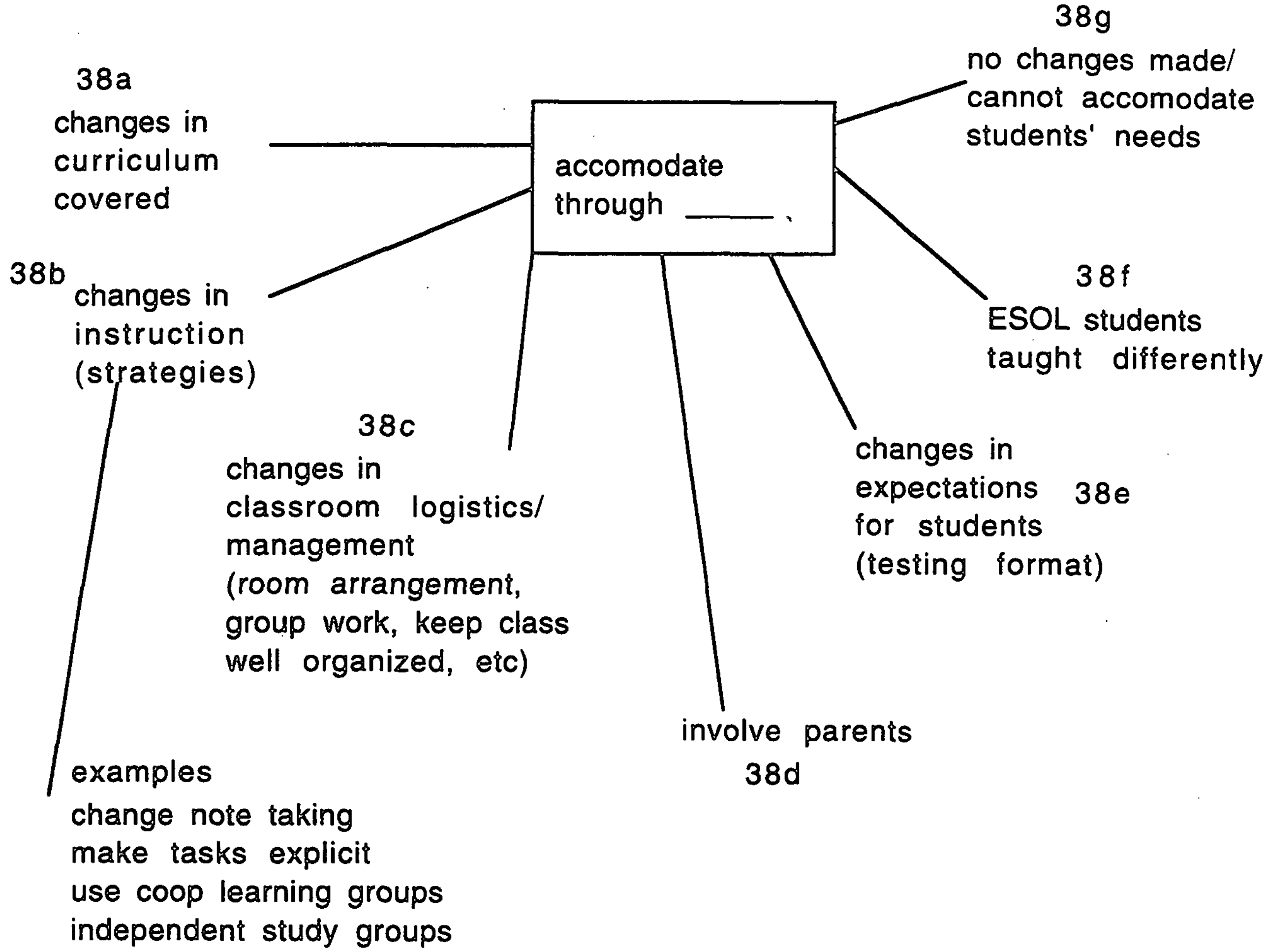


37. What are some of the things you believe your students value most about their educational experience in your classroom?



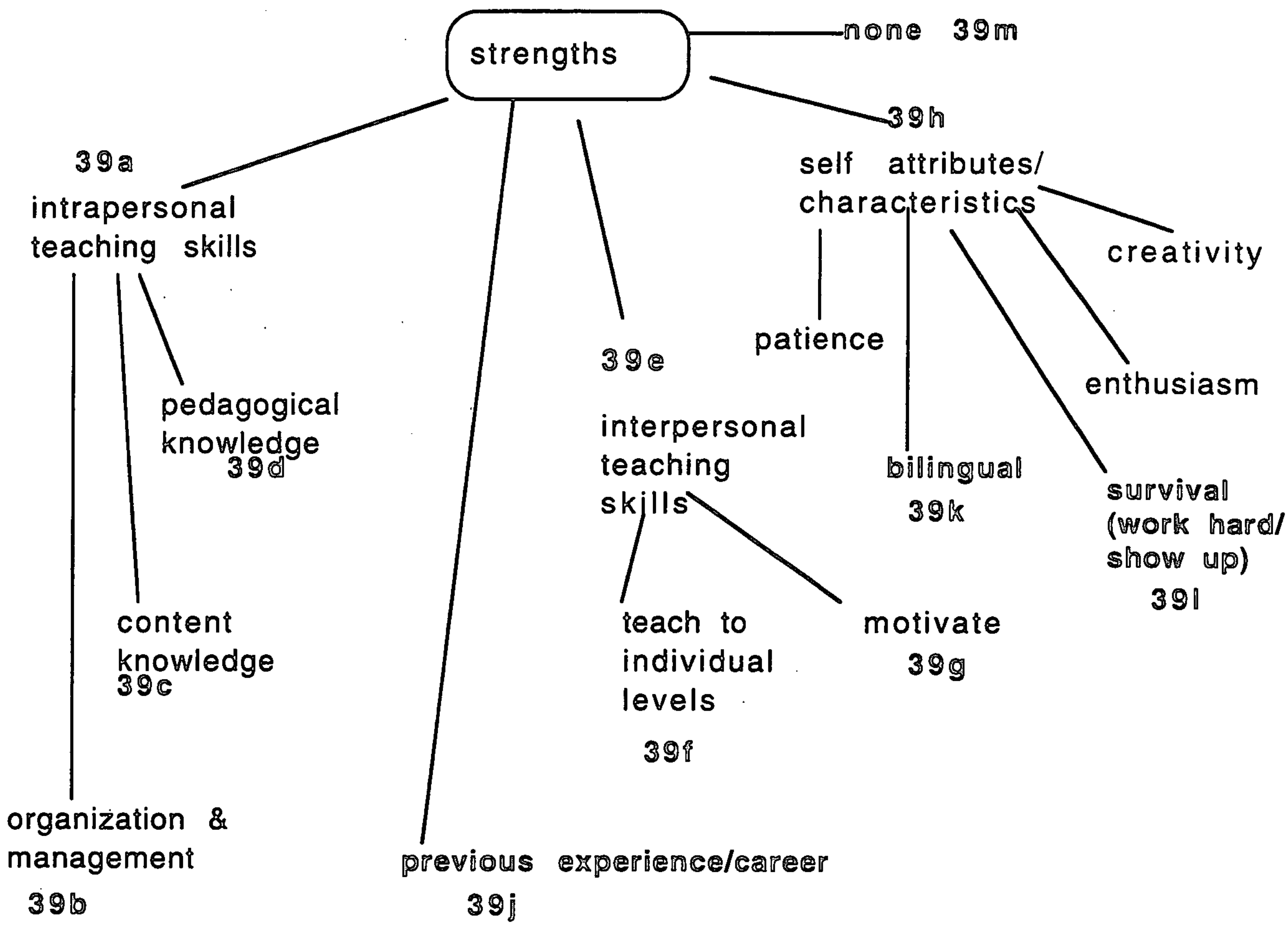
37h=other

38. HOW DO YOU ACCOMODATE STUDENTS WITH SPECIAL NEEDS IN YOUR CLASSROOM?



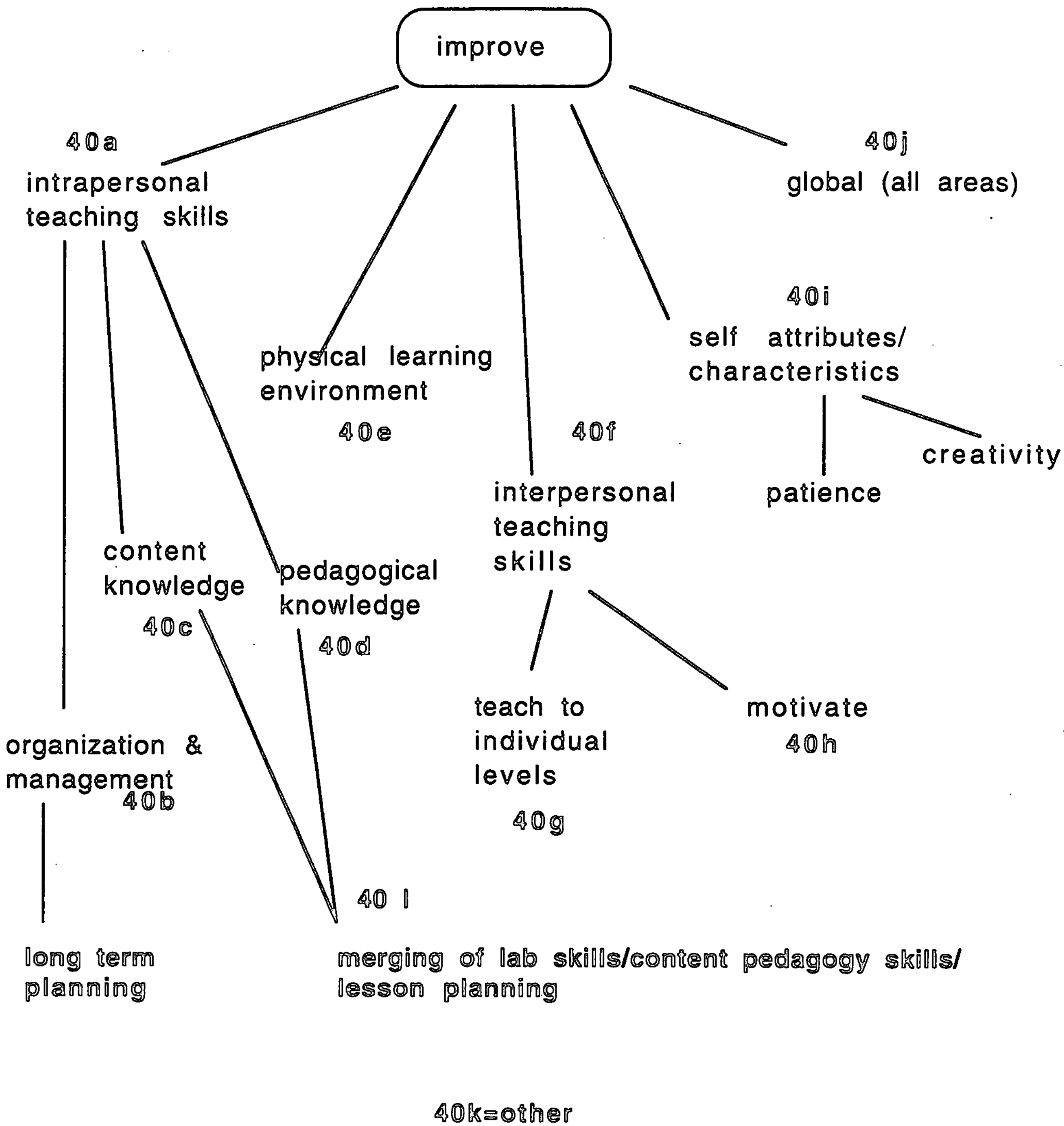
38h=other

39. What are your main strengths as a teacher?

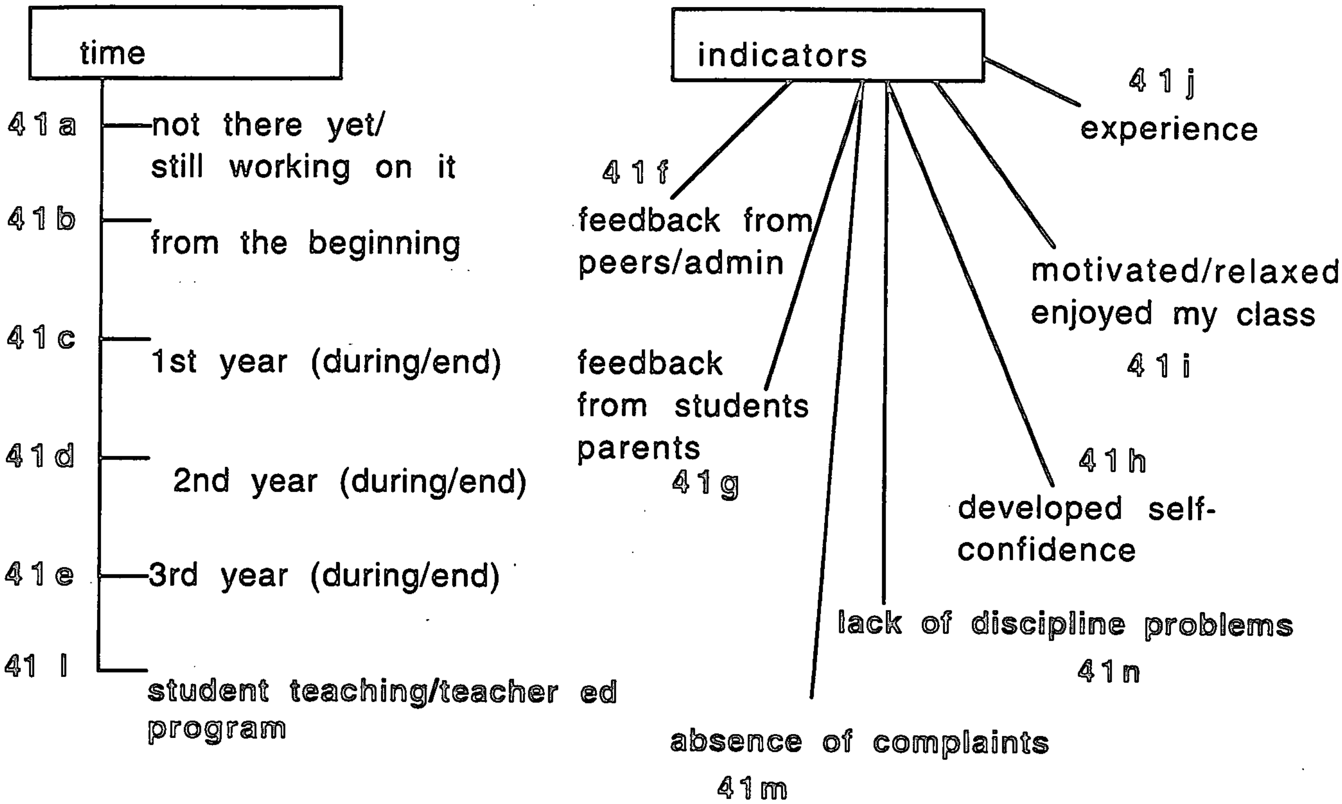


39i=other (i.e., real world applications)

40. In what areas would you like to improve as a teacher?

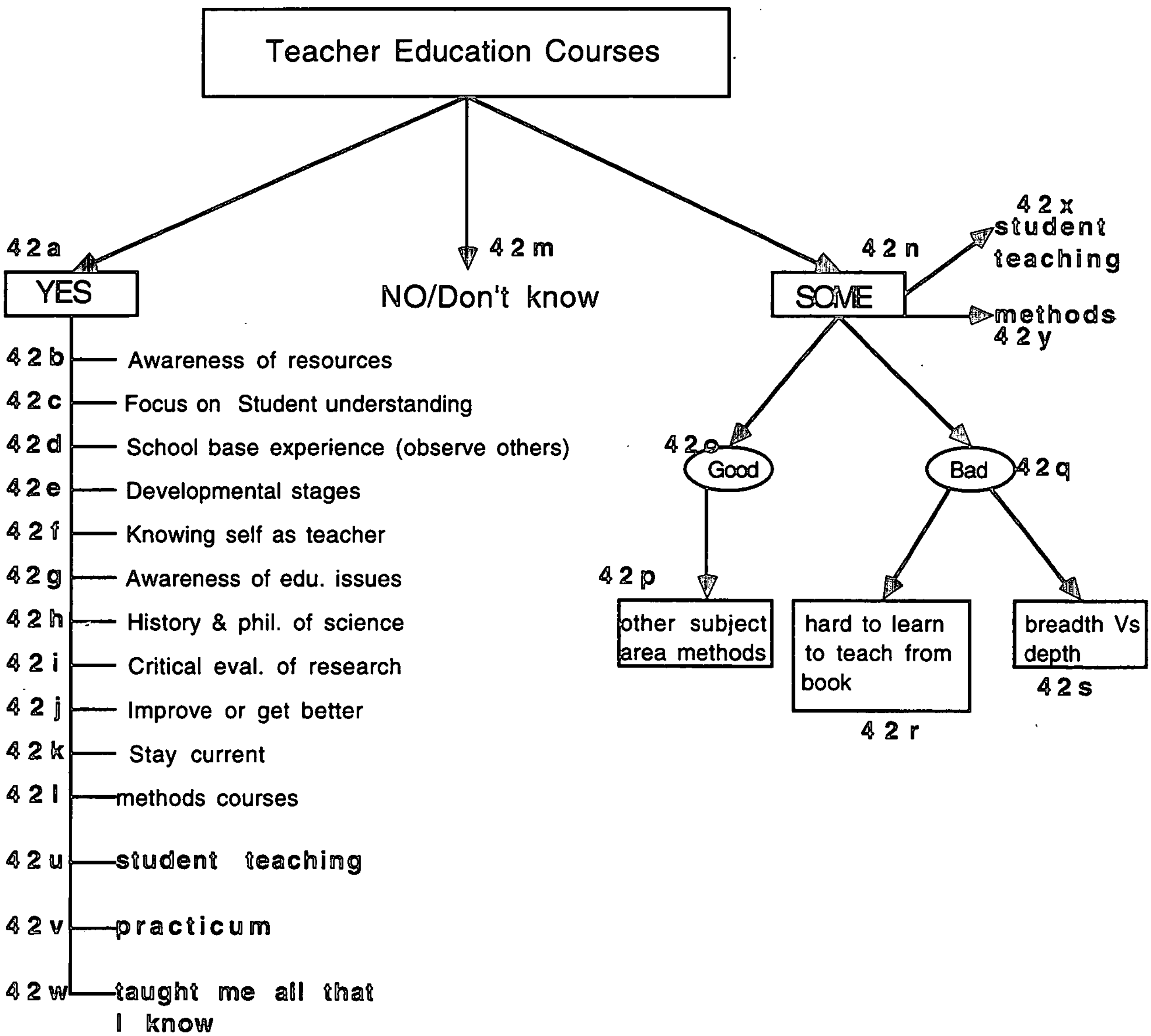


41. When did you realize you were becoming a good teacher?



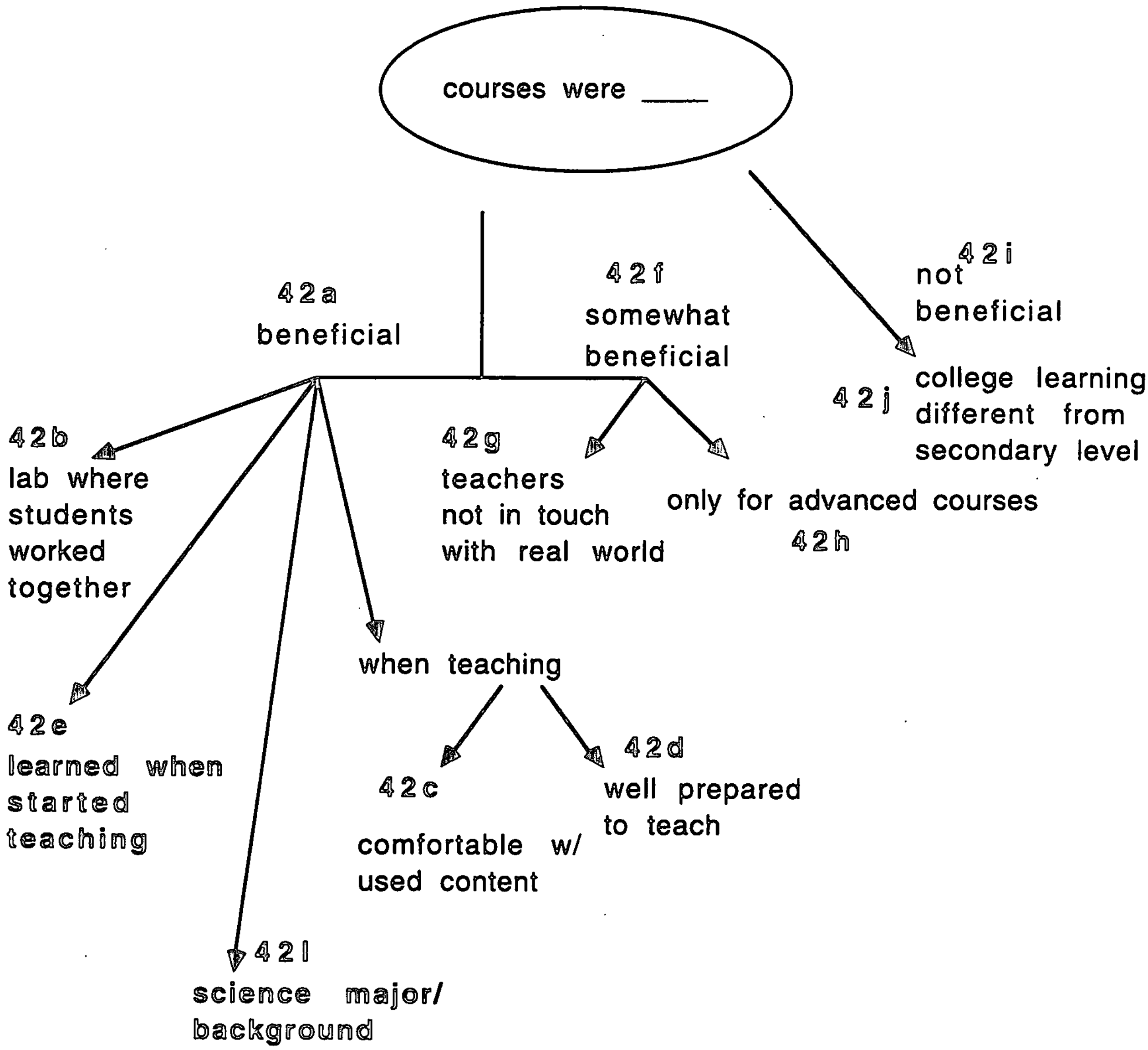
41k= other (i.e., when no more discipline problems, change in admin., teaching became more than just job)

Q. 42A. Were your undergraduate education courses beneficial to you when you began teaching?



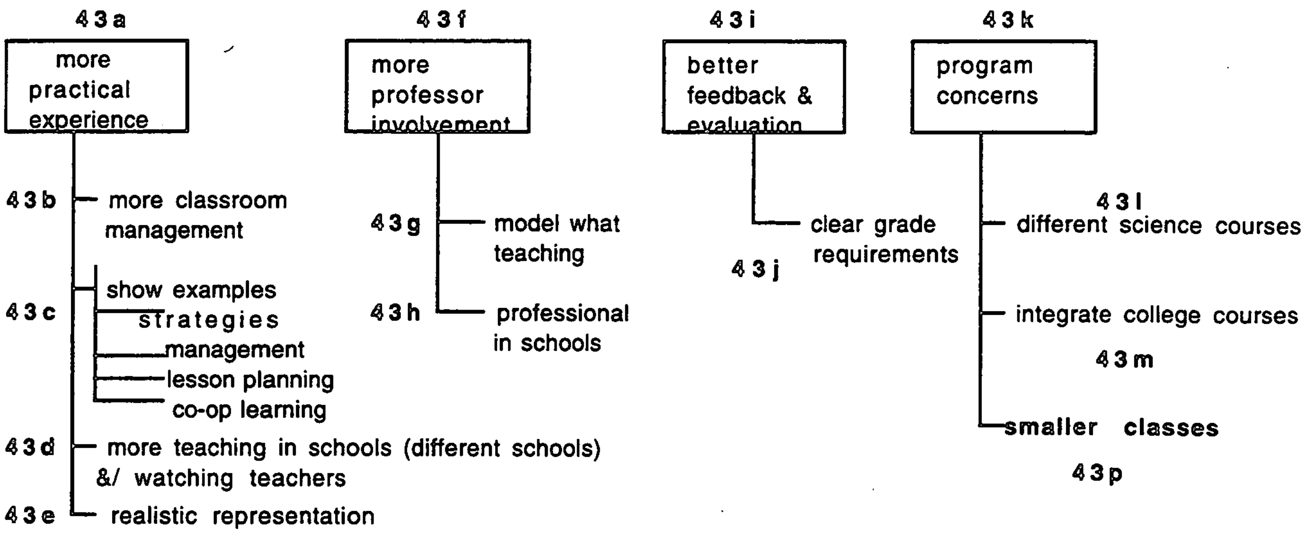
42t=other

42B. Were your undergraduate science/math courses beneficial to you when you began teaching? Why or why not?



42k=other

Q. 43A. What changes would you make in undergraduate education courses to make the experience more meaningful?



43n=other

43B. What changes would you make in your undergraduate science/math courses?

Instructors

- 43a changeteaching methods
- 43b improve communication skills
- 43c use real world applications
- 43d give better feedback/eval.

Courses

- 43e more meaningful experiences
- 43f focus on practical applications
- 43g focus on solving real problems (lessen memoriz.)
- 43k focus more on teaching aspect (special sections)

Settings

- 43h reduce class size
- 43i emphasize outdoor settings

43j=other

44. In reference to your teaching model...pie chart
code from percent and origin columns (enter percent code AND origin code)

Percent of model		Origin	
44a	-0-10	44i	-on the job experience
44b	-11-20	44j	-teacher ed program
44c	-21-30	44k	-family
44d	-31-40	44l	-religious background
44e	-41-50	44m	-previous career/job
44f	-51-60	44n	-self (characteristics)
44g	-61-70		
44h	-70-100		

44o=other

Salish I Research Project
Video Portfolio/Classroom Observation[1]

Standard Operating Procedures

This section contains the procedures and measures for videotaping or observing the NTs' classrooms. Whenever videotaping and/or observing are undertaken, the following measures should be completed:

1. Unit Content Journal by NT
2. Five Days of Daily Journal by NT
3. Videotaping and/or Observation on Days 2, 3, and 4
4. Student Questions on Days 2, 3, and 4

Directions for Teachers

The intention is for videotaping to occur on three consecutive days in the same class. You have already administered student measures (GOALS, the Student Information Sheet and The Nature and Implications of Science/Mathematics) to one class; this is the class that should be videotaped.

At the beginning of a unit of study, please fill in the **Unit Content Journal**.

Choose **five consecutive lessons** from somewhere in the middle of the unit. On each of these five days, please write in your **Daily Journal**, using the forms provided. Questions 1-4 of the Daily Journal are to be answered before the lesson is taught; Questions 5-7 are to be answered after the lesson is taught. Under activities in Question 5, please list any activity that lasts for more than 3 minutes. Some lessons might include only one activity, while others might include several activities. If one activity has several parts, please list separately any part that lasts for more than 3 minutes. For example, a lab might take up two lessons. But your lists of activities might include giving directions, passing out equipment, or student writing time as parts of that activity. The total time to complete these journals should be one to two hours. If you need more room for your answers than what is provided on the Daily Journal, please add extra paper.

On **days 2, 3, and 4** of the lessons described in your journal, please **videotape** your class. Advice for obtaining good quality tapes follows. In addition, on these three days, please take 5 minutes at the end of each class for your students to answer the three **Student Questions**.

Videotaping/Observation Procedures for Researchers/Teachers

Five different methods for videotaping and/or observing classrooms are given below. While any of these are acceptable, the ideal is to have a mobile camera with an observer (Section E). The method of using a stationary camera (Section A) should be avoided if at all possible by having a student from a study hall or another teacher available to operate the camera.

When observations are not possible while videotaping, a good dialogue needs to occur between the NT and the researcher (over the phone or in person) about the atmosphere of the classroom, the school, the overall makeup of the class, and any particular challenges the teacher might have concerning these. A special circumstance might not always be evident from the videotaping alone and wrong assumptions may be made without this dialogue. It would be best to have a

[1]Developed by James Gallagher and Joyce Parker with contributions from Judith Burry-Stock and Leslee Brackin.

conversation right before or right after the taping so that the circumstances surrounding the videotaping are not forgotten.

A. Stationary Camera

The following are some recommendations for obtaining good quality tapes that yield useful data on teaching:

1. Place the camera in the back corner of the room near the windows, and set it on wide angle. The intention is to maximize the number of students who are in the field of view and to minimize the back lighting from the windows.

2. When videotaping, use the "plug-in" power supply rather than batteries to ensure continuous videotaping. (Batteries tend to run out at inappropriate times.)

3. Label the tape with name, date, grade or subject, ability level (if appropriate), number of students present, and number of students in the field of view.

4. Start taping at the beginning of class. Be sure to set the timer to the actual time of day and record the time on the tape. This will be invaluable in analysis. Check the camera occasionally to see that it is continuing to record the events of instruction. Change the angle if needed to follow the teacher and to include as many students as possible.

5. Turn off the tape after the class ends. A second lesson may be recorded on the same tape if space is sufficient. However, that does provide some problems with labeling, and therefore we encourage a fresh tape for each lesson.

B. Mobile Camera

When someone from the school or an outsider is available to operate the camera, the following procedures should be used:

1. Follow the procedures above, but some attention may be given to one or two groups of students at work if group work is part of the lesson. However, remember that the study is of the teacher; therefore, most of the tape should include the teacher. A "talking head" is not desirable. Our goal is to see the teacher and the students and to be able to study their interactions.

2. Be unobtrusive! A camera that is over-tended by the operator can be quite distracting. It is far better to check the camera periodically, make adjustments desired, and then step away from it. The operator should blend into the background as much as possible.

3. A cordless microphone that clips onto the teacher will result in better sound quality, but the students' responses will be lost. To obtain good sound quality, it will be necessary to use a microphone on the teacher and have other microphones for students' voices. This will require a mixer. Unless multiple microphones and a mixer are available, use the built-in microphone on the camera. (Radio Shack has a three microphone wireless system available for about $160.)

4. Come early, if possible, and videotape the classroom environment, focusing on lab and computer facilities, storage areas, and any projects shown on the walls or elsewhere in the classroom.

C. **Observation Field Notes:**

1. Allow for at least 5 minutes (in between bells) before and after the class period. If a period can be planned where it's flanked on either side by a planning period, that would be ideal.

2. Use the time before class to get the teacher talking about the class, i.e., use questions such as, "How is this class?" "How are these students?" Probe with questions such as "How do these students perform for you?"

3. Use the time before class to get the teacher talking about the school, i.e., "How do you like it here?" "How's your department set up?" "How does funding work here?"

4. Use a symbol (*, ?, etc.) to mark things in your notes that you will want to clarify with the teacher later.

5. Use the time after class and before class the next day to ask questions about those things that need clarification. For example, concerning technologies and utilities present: "How are they used?" "How often?" If the teacher calls on certain students more often: "What are the circumstances with those students?" Concerning the use of cooperative grouping: "How are groups formed?" "How do you feel about it?"

D. **Stationary Camera with Observer**

This procedure requires only one person. Set up the camera as in Section A and take observational field notes as in Section C.

E. **Mobile Camera with Observer**

This procedure requires two people. Follow Sections B and C above.

Salish I Research Project
Video Portfolio/Classroom Observation
Unit Content Journal

Date ____________________ Teacher Name ____________________

School ____________________ Course Title ____________________

Grade of Class ____________________ Class Hours ____________________

Topic of Unit ____

Unit Content (key facts and concepts, processes, applications, attitudes, and habits of mind, i.e., ways of thinking like a scientist/mathematician addressed in the unit). This can be an outline, concept map, or any other representation that you choose. Please include enough detail so that you create a mental picture of the unit for an outsider.

Salish I Research Project
Video Portfolio/Classroom Observation
Daily Journal

Date ______________________ Teacher Name ______________________

School ______________________ Course Title ______________________

Day 1 2 3 4 5 TAPE # ______________________
(If you are taping)

Lesson Planning: Complete Questions 1-4 before you teach the day's lesson.

Topic of the Lesson: ______________________

1. Lesson content (key facts & concepts, processes, applications, attitudes, and habit of mind, i.e., ways of thinking like a scientist/mathematician included in this lesson).

2. What are your intended outcomes (i.e., goals, purposes, objectives)? How does this lesson contribute to your goals for the unit?

3. What knowledge, skills, attitudes, etc., did your students have prior to the lesson? How did you determine this?

4. Materials and/or text to be used. (Please include copies with your journal entries.)

(continued)

Reflection: Complete Questions 5 and 6 at the end of the day's lesson.

_____ Number of students present.

5. Please summarize any activities that lasted at least three minutes.

   Activities — How did this activity contribute to your goals?

6. How do you know that your students learned what you wanted them to?

Complete the following question on Day 5 only, at the end of the unit of study.

7. If you were to redo this five-day unit of study, what would you change?

Analyzing the Video and Observational Data

The video and, or, observational data are analyzed using Cultural Diversity Scale and the coding scheme of the Secondary Teacher Analysis Matrix (STAM). The Cultural Diversity Scale is a questionnaire addressing how a teacher deals with nine dimensions of cultural diversity. It is filled in by the researcher after watching the video tapes. The researcher rates a teacher's actions for each of the nine cultural diversity dimensions. One summary paragraph consisting of nine statements is then written. This paragraph is put into a Teacher Data Matrix described later in this instrument package.

There are two versions of STAM, one for mathematics and one for science. Directions for using STAM, and directions to write a video summary of STAM, are included on each version. The video summary is inserted in a Teacher Data Matrix described later in this instrument package.

The STAM is a matrix. Teaching styles are used as labels for the six columns. They are didactic, transitional, conceptual, early constructivist, experiences constructivist, and constructivist inquiry. Dimensions of what is going on in the classroom are used as labels for rows. There are twenty-two rows: (1) Structure of content, (2) Examples and connections, (3) Limits, exceptions, and multiple interpretations, (4) Processes and history of science/mathematics, (5) Methods, (6) Labs, demos, hands-on labs for science, hands-on, calculators, computers for mathematics, (7) Teacher-student interactions about subject matter, (8) Teacher's questions focused on ..., (9) Kinds of assessment, (10) Uses of assessment in addition to grading, (11) Teacher's responses to students' ideas about subject matter, (12) Writing and other representations of ideas, (13) Students' questions, (14) Student/student interactions about subject matter, (15) Student initiated activity, (16) Students' understanding of teacher's expectations, (17) Richness of resources, (18) Uses of resources, (19) Access to resources, (20) Decision making, (21) Teaching aids, (22) Students' work displayed. Groups of rows are combined into areas labeled as follows: Rows 1- 4 are combined into the area labeled, Content. Rows 5-11 are labeled Teacher Actions. Rows 12 - 16 are labeled Student Actions. Rows 17-19 are labeled Resources. Rows 20 - 22 are labeled Environment. The meaning of each cell is described in the table that follows on the STAM analysis forms. An example of a video summary follows this table.

Salish I Research Project
Cultural Diversity Scale*

	Check One			
	Always	Sometimes	Never	No Basis for Judging
1. The New Teacher (NT) uses language that is not biased by gender; e.g., does NOT refer to all workers as "he" or all nurses as "she."	____	____	____	____
2. The NT gives equal attention to				
a. males and females.	____	____	____	____
b. students of different cultures.	____	____	____	____
3. The NT uses similar forms of discipline with				
a. males and females.	____	____	____	____
b. students of different cultures.	____	____	____	____
4. When questioning students about the lesson, the NT calls equally on				
a. males and females.	____	____	____	____
b. students of different cultures.	____	____	____	____
5. The NT uses stereotypes, put downs, jokes, or generalizations when referring to				
a. males or females.	____	____	____	____
b. students of different cultures.	____	____	____	____
6. The NT uses examples that show diversity with respect to				
a. gender.	____	____	____	____
b. students of different cultures.	____	____	____	____
7. When the students interact, the NT requires that they treat each other as equals, challenging their biased/stereotypical remarks or behavior.	____	____	____	____
8. The NT adapts materials to meet the needs of all students.	____	____	____	____
9. The NT adapts instruction to meet the needs of all students.	____	____	____	____

* Adapted from "Teacher's Self-Evaluation of Non-Biased Behavior" by Dolores A. Grayson.

Secondary Science Teacher Analysis Matrix © — Revised, August 1995

J. Gallagher and J. Parker — Michigan State University

Directions for Salish Project Use

ANALYSIS OF TEACHERS' JOURNALS

Analyze the Teacher's Journal first. Code each group of responses that pertain to one concept on a SSTAM Analysis Record. Enter a "J" in a particular color ink to distinguish this from video analysis. Do not forget the back of the form.

ANALYSIS OF VIDEOS

While reviewing a teacher's video tapes, you will complete three records:

- Record of Activities
- SSTAM Analysis Record - found inside of this folder
- Summary

Record of Activities

The Record of Activities is a catalogue of the classroom activities and transitions seen in the video. It should include the tape number, the date the tape was made, A or T designating activity or transition, the beginning time of the activity or transition, and a brief description of each activity or transition. A sample entry follows.

Date	Tape #	A or T	Start time	Description
2/8/95	1	A1	0:00	T explaining "Create a Baby" act.
		T1	0:13	Transition to groups
		A2	0:16	Group work creating baby's genes

This signifies that this first tape was made on 2/8/95 and the major activities were the teacher explaining to the class how they will "Create a Baby" which starts at the beginning of the class and group work following it in which students created a fictitious baby's genetic make-up.

The Record of Activities will be used in two ways: (1) as a reference for the SSTAM Analysis Record and (2) as a reference for further analysis of the videos. For the example given above, the Activity 2 could be cited as 1.A2 on the SSTAM Analysis Sheet. That would mean Tape 1, Activity A2.

SSTAM Analysis Record

We suggest that analysis be done by two, or even three people watching the tape together, especially as you learn to use this Matrix. Become familiar with the full matrix first. If an entry on the Analysis record seems unclear, refer to the full matrix. You may wish to make notes on the Analysis Record as you watch the tape.

- Use one SSTAM Analysis Record for the three tapes. Use a different color for each class session.
- After you have watched an entire class session, stop the tape. Code each activity and transition on the SSTAM Analysis Record as completely as possible. To designate an impression that comes from the entire class session instead of from a particular activity, use 1X, 2X, etc. where the number identifies the class session.

Summary

The summary consists of six paragraphs: an initial paragraph describing the teacher's overall teaching style with whatever qualifiers seem necessary; one paragraph for each of the five areas in the matrix. These five paragraphs should include at least one sentence for each of the 22 dimension of the matrix. At the end of each sentence enter the three cell designations that best describe what you saw on each of the three tapes. Example: 14. Student-student interaction dealt with procedures and correctness of homework answers. D1: 14BC, D2: 14C, D3: 14B

Sec. Sci. Teacher Analysis Matrix J. Gallagher & J. Parker May, 1995 © Revised Aug. '95	Teacher: Analyst:

Date of Analysis:

TEACHING STYLE	A. DIDACTIC	B. TRANSITION	C. CONCEPTUAL
1. Structure of content	*factoids*	*descriptive*	*explanatory*
2. Examples & connections	none	not integrated	made by T
3. Limits, exceptions, & multiple interpretations	*not present*	*some included* *not integrated*	*part of content*
4. Processes & History of science	rote scientific method	not integrated	integrated by teacher
5. Methods	*1 or 2 T-centered*	*3 or 4 T-centered*	*many T-centered*
6. Labs, demos, hands-on	rare	cookbook or undirected	conceptually focused
7. T-S interactions about subject matter	*little*	*about unconnected ideas*	*about conceptual content*
8. T's questions focused on...	factual recall	unconnected ideas	concepts & connections
9. Kinds of assessment	*tests & quizzes only*	*occasionally others*	*frequently others*
10. Uses of assessment in addition to grading	none	checking Ss' knowledge	checking Ss' knowledge & preplanning
11. T's responses to Ss' ideas about subj. matter	*disregards*	*accepts all ideas*	*seeks to change unscientific ideas*
12. Writing & other representations of ideas	short answers	different reconfigurations of info. provided rare	several
13. Students' questions	*few*	*procedural*	*procedural & conceptual*
14. S/S interactions about subject matter	rare	about procedure	about correctness
15. Student-initiated activity	*rare*	*Ss volunteer examples* *few*	*some*
16. Ss' understanding of teacher's expectations	Ss passive or ignore procedures	confusion over procedure	expectancies accepted
17. Richness of resources	*little beyond single format*	*small number, some hands-on*	*multiple*
18. Uses of resources	looked at only, not related		related to ideas
19. Access to resources		*T-controlled*	*some discussion*
20. Decision making	T-dominated	T-controlled	some discussion of time use
21. Teaching aids	*few*	*some* *may not be integrated w/ content*	*many, related to content*
22. Students' work displayed	few	similar from all Ss some	many

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<table>
<tr><th>D. EARLY CONSTR.</th><th>E. EXPERIENCED CONSTR.</th><th>F. INQUIRY</th><th></th></tr>
<tr><td colspan="2">T & Ss negotiate understanding</td><td rowspan="2">investigations dominate</td><td rowspan="2">1</td></tr>
<tr><td>T's content</td><td>based in content & Ss' ideas</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td><td>constructed by Ss</td><td>2</td></tr>
<tr><td colspan="2">identification & use</td><td rowspan="2">as part of problem solving</td><td rowspan="2">3</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td></tr>
<tr><td colspan="2">use of process to formulate ideas</td><td rowspan="2">applied to investigations</td><td rowspan="2">4</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td></tr>
<tr><td colspan="2">S-centered</td><td rowspan="2">question dependent</td><td rowspan="2">5</td></tr>
<tr><td>some</td><td>extensive</td></tr>
<tr><td colspan="3">build on Ss' ideas</td><td rowspan="2">6</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td><td>guided by question</td></tr>
<tr><td colspan="2">clarification & usefulness of Ss' ideas</td><td rowspan="2">S input into goals</td><td rowspan="2">7</td></tr>
<tr><td>T-directed</td><td>T & Ss have input</td></tr>
<tr><td colspan="3">emerge from Ss' ideas & instr. goals</td><td rowspan="2">8</td></tr>
<tr><td>occasionally</td><td>frequently</td><td>guiding investigation</td></tr>
<tr><td colspan="3">multiple forms of assessment</td><td rowspan="2">9</td></tr>
<tr><td>of knowledge & understanding</td><td>mainly of understanding</td><td>arise from investigation</td></tr>
<tr><td colspan="2">adjusting activities</td><td rowspan="2">T & Ss designing investigation</td><td rowspan="2">10</td></tr>
<tr><td>by T</td><td>by T & Ss</td></tr>
<tr><td>considers in instr.. decisions</td><td>assessment drives T's decisions</td><td>T is co-investigator w/ self-directed Ss</td><td>11</td></tr>
<tr><td colspan="3">Ss use to construct meaning</td><td rowspan="2">12</td></tr>
<tr><td>occasionally/some reconfig.</td><td>frequently</td><td>Ss choose form</td></tr>
<tr><td>some conceptual, some procedural</td><td>mainly conceptual</td><td>conceptual, applied to investigation</td><td>13</td></tr>
<tr><td>some about procedure
some about understanding</td><td>about understanding</td><td>about understanding & planning</td><td>14</td></tr>
<tr><td colspan="3">Ss contribute examples and analysis</td><td rowspan="2">15</td></tr>
<tr><td>may be weakly connected</td><td>pertinent</td><td>guide class direction</td></tr>
<tr><td>frustrations w/ role</td><td>role & procedures negotiated w/ Ss</td><td>Ss define role</td><td>16</td></tr>
<tr><td colspan="3">multiple resources</td><td>17</td></tr>
<tr><td colspan="2">aid understanding & application</td><td rowspan="2">integrated into investigation</td><td rowspan="2">18</td></tr>
<tr><td>some</td><td>many</td></tr>
<tr><td>T-guided</td><td>negotiated by T & Ss</td><td>guided by question</td><td>19</td></tr>
<tr><td colspan="3">joint decision making</td><td rowspan="2">20</td></tr>
<tr><td>some</td><td>much</td><td>applied to investigation</td></tr>
<tr><td colspan="3">made by Ss</td><td rowspan="2">21</td></tr>
<tr><td>some</td><td>many</td><td>derived from investigation</td></tr>
<tr><td colspan="3">Ss' creations</td><td rowspan="2">22</td></tr>
<tr><td>some</td><td>many</td><td>derived from investigations</td></tr>
</table>

REFLECTION

	Extent of Reflection		
Focus of Reflection	Description	Analysis	Action Plan
Teacher			
Logistics			
Ss' understanding			
Ss' affective response			

Reflection focus	Self					Students

Examples

1. Reflection focused on students' understanding, including an action plan: "The students didn't make the connection between buoyancy and pressure in the Cartesian diver, because I didn't talk about it enough. Tomorrow I will repeat that point." This entry would be scored with a line across the top 3 boxes, because it contains a description, analysis of the cause of a problem, and suggested action.

2. Descriptive reflection focused on logistics: "This lab was too long. "This entry would be scored in the left-hand box next to "Logistics" since there is no analysis or action plan.

OTHER FACTORS

Accuracy of content	low				high
History of scientific ideas	none included				integrated in content
Quality of S/T inter-personal interactions	hostile		neutral/ passive		cooperative
Quality of S/S inter-personal interactions	hostile		neutral/ passive		cooperative
Student behavior	disruptive		neutral/ passive		cooperative
Student engagement	off-task				on-task
Transitions	poorly organized prolonged				natural smooth
Use of time	much down time				well organized
Facilities	directed towards teacher, unchanging				flexible changed frequently

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Secondary Teacher Analysis Matrix - Mathematics Version

J. Gallagher and J. Parker Michigan State University

May, 1995 © Revised October, 1995

Directions for Salish Project Use

ANALYSIS OF TEACHERS' JOURNALS

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ANALYSIS OF VIDEOS

While reviewing a teacher's video tapes, you will complete three records:

- Record of Activities
- STAM Analysis Record - found inside of this folder
- Summary

Record of Activities

The Record of Activities is a catalogue of the classroom activities and transitions seen in the video. It should include the tape number, the date the tape was made, A or T designating activity or transition, the beginning time of the activity or transition, and a brief description of each activity or transition. A sample entry follows.

Date	Tape #	A or T	Start time	Description
2/8/95	1	A1	0:00	T explaining the Pythagorean Theorem
		T1	0:13	Transition to groups
		A2	0:16	Group Problem Solving

This signifies that this first tape was made on 2/8/95 and the major activities were the teacher explaining the Pythagorean Theorem to the class which starts at the beginning of the class. Group work follows in which students do problem solving.

The Record of Activities will be used in two ways: (1) as a reference for the STAM Analysis Record and (2) as a reference for further analysis of the videos. For the example given above, the Activity 2 could be cited as 1.A2 on the STAM Analysis Sheet. That would mean Tape 1, Activity A2.

STAM Analysis Record

We suggest that analysis be done by two, or even three people watching the tape together, especially as you learn to use this Matrix. Become familiar with the full matrix first. If an entry on the Analysis record seems unclear, refer to the full matrix. You may wish to make notes on the Analysis Record as you watch the tape.

- Use one STAM Analysis Record for the three tapes. Use a different color for each class session.
- After you have watched an entire class session, stop the tape. Code each activity and transition on the STAM Analysis Record as completely as possible. To designate an impression that comes from the entire class session instead of from a particular activity, use 1X, 2X, etc. where the number identifies the class session.

Summary

The summary consists of six paragraphs: an initial paragraph describing the teacher's overall teaching style with whatever qualifiers seem necessary; one paragraph for each of the five areas in the matrix. These five paragraphs should include at least one sentence for each of the 22 dimension of the matrix. At the end of each sentence enter the three cell designations that best describe what you saw on each of the three tapes. Example: 14. Student-student interaction dealt with procedures and correctness of homework answers. D1: 14BC, D2: 14C, D3: 14B

Date of Analysis:
Teacher:
Analyst:

<table>
<tr><th>D. EARLY CONSTR.</th><th>E. EXPERIENCED CONSTR.</th><th>F. INQUIRY</th><th></th><th></th></tr>
<tr><td colspan="2">T & Ss negotiate understanding</td><td rowspan="2">investigations dominate</td><td rowspan="2">1</td><td rowspan="7">CONTENT</td></tr>
<tr><td>T's content</td><td>based in content & Ss' ideas</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td><td>constructed by Ss</td><td>2</td></tr>
<tr><td colspan="2">identification & use</td><td rowspan="2">as part of problem solving</td><td rowspan="2">3</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td></tr>
<tr><td colspan="2">use of process to formulate ideas</td><td rowspan="2">applied to investigations</td><td rowspan="2">4</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td></tr>
<tr><td colspan="2">S-centered</td><td rowspan="2">question dependent</td><td rowspan="2">5</td><td rowspan="13">TEACHER'S ACTIONS</td></tr>
<tr><td>some</td><td>extensive</td></tr>
<tr><td colspan="3">build on Ss' ideas</td><td rowspan="2">6</td></tr>
<tr><td>lead by T</td><td>constructed by T & Ss</td><td>guided by question</td></tr>
<tr><td colspan="2">clarification & usefulness of Ss' ideas</td><td rowspan="2">S input into goals</td><td rowspan="2">7</td></tr>
<tr><td>T-directed</td><td>T & Ss have input</td></tr>
<tr><td colspan="3">emerge from Ss' ideas & instr. goals</td><td rowspan="2">8</td></tr>
<tr><td>occasionally</td><td>frequently</td><td>guiding investigation</td></tr>
<tr><td colspan="3">multiple forms of assessment</td><td rowspan="2">9</td></tr>
<tr><td>of knowledge & understanding</td><td>mainly of understanding</td><td>arise from investigation</td></tr>
<tr><td colspan="2">adjusting activities</td><td rowspan="2">T & Ss designing investigation</td><td rowspan="2">10</td></tr>
<tr><td>by T</td><td>by T & Ss</td></tr>
<tr><td>considers in instr.. decisions</td><td>assessment drives T's decisions</td><td>T is co-investigator w/ self-directed Ss</td><td>11</td></tr>
<tr><td colspan="3">Ss use to construct meaning</td><td rowspan="2">12</td><td rowspan="7">STUDENTS' ACTIONS</td></tr>
<tr><td>occasionally/some reconfig.</td><td>frequently</td><td>Ss choose form</td></tr>
<tr><td>some conceptual, some procedural</td><td>mainly conceptual</td><td>conceptual, applied to investigation</td><td>13</td></tr>
<tr><td>some about procedure
some about understanding</td><td>about understanding</td><td>about understanding & planning</td><td>14</td></tr>
<tr><td colspan="3">Ss contribute examples and analysis</td><td rowspan="2">15</td></tr>
<tr><td>may be weakly connected</td><td>pertinent</td><td>guide class direction</td></tr>
<tr><td>frustrations w/ role</td><td>role & procedures negotiated w/ Ss</td><td>Ss define role</td><td>16</td></tr>
<tr><td colspan="3">multiple resources</td><td>17</td><td rowspan="4">RESOURCES</td></tr>
<tr><td colspan="2">aid understanding & application</td><td rowspan="2">integrated into investigation</td><td rowspan="2">18</td></tr>
<tr><td>some</td><td>many</td></tr>
<tr><td>T-guided</td><td>negotiated by T & Ss</td><td>guided by question</td><td>19</td></tr>
<tr><td colspan="3">joint decision making</td><td rowspan="2">20</td><td rowspan="6">ENVIRON.</td></tr>
<tr><td>some</td><td>much</td><td>applied to investigation</td></tr>
<tr><td colspan="3">made by Ss</td><td rowspan="2">21</td></tr>
<tr><td>some</td><td>many</td><td>derived from investigation</td></tr>
<tr><td colspan="3">Ss' creations</td><td rowspan="2">22</td></tr>
<tr><td>some</td><td>many</td><td>derived from investigations</td></tr>
</table>

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STAM Analysis Record - Mathematics Version

Secondary Teacher Analysis Matrix - Mathematics Version
J. Gallagher & J. Parker
May, 1995 © Revised October, 1995

	TEACHING STYLE	A. DIDACTIC	B. TRANSITION	C. CONCEPTUAL
CONTENT	*1. Structure of content*	*factoids*	*descriptive*	*explanatory*
CONTENT	2. Examples & connections	none	not integrated	made by T
CONTENT	*3. Limits, exceptions, & multiple interpretations*	*not present*	*some included not integrated*	*part of content*
CONTENT	4. Processes & history of mathematics	static/algorithmic approach	some connections, not integrated	teacher integrates history and process
TEACHER'S ACTIONS	*5. Methods*	*1 or 2 T-centered*	*3 or 4 T-centered*	*many T-centered*
TEACHER'S ACTIONS	6. Labs, hands-on, calculators, computers	rare	cookbook or undirected	conceptually focused
TEACHER'S ACTIONS	*7. T-S interactions about subject matter*	*little*	*about unconnected ideas*	*about conceptual content*
TEACHER'S ACTIONS	8. T's questions focused on...	factual recall	unconnected ideas	concepts & connections
TEACHER'S ACTIONS	*9. Kinds of assessment*	*tests & quizzes only*	*occasionally others*	*frequently others*
TEACHER'S ACTIONS	10. Uses of assessment in addition to grading	none	checking Ss' knowledge	checking Ss' knowledge & preplanning
TEACHER'S ACTIONS	*11. T's responses to Ss' ideas about subj. matter*	*disregards*	*accepts all ideas*	*seeks to change unscientific ideas*
STUDENTS' ACTIONS	12. Writing & other representations of ideas	short answers	different reconfigurations of info. provided rare	several
STUDENTS' ACTIONS	*13. Students' questions*	*few*	*procedural*	*procedural & conceptual*
STUDENTS' ACTIONS	14. S/S interactions about subject matter	rare	about procedure	about correctness
STUDENTS' ACTIONS	*15. Student-initiated activity*	*Ss volunteer examples* *rare*	*few*	*some*
STUDENTS' ACTIONS	16. Ss' understanding of teacher's expectations	Ss passive or ignore procedures	confusion over procedure	expectancies accepted
RESOURCES	*17. Richness of resources*	*little beyond single format*	*small number, some hands-on*	*multiple*
RESOURCES	18. Uses of resources	looked at only, not related		related to ideas
RESOURCES	*19. Access to resources*	*T-controlled*		*some discussion*
ENVIRON.	20. Decision making	T-dominated	T-controlled	some discussion of time use
ENVIRON.	*21. Teaching aids*	*few* *may not be integrated w/ content*	*some*	*many, related to content*
ENVIRON.	22. Students' work displayed	similar from all Ss few	some	many

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REFLECTION

	Extent of Reflection		
Focus of Reflection	Description	Analysis	Action Plan
Teacher			
Logistics			
Ss' understanding			
Ss' affective response			

Reflection Focus	Self					Students

OTHER FACTORS

Accuracy of content	low				high
History of mathematical ideas	none included				integrated in content
Quality of S/T inter-personal interactions	hostile		neutral/ passive		cooperative
Quality of S/S inter-personal interactions	hostile		neutral/ passive		cooperative
Student behavior	disruptive		neutral/ passive		cooperative
Student engagement	off-task				on-task
Transitions	poorly organized prolonged				natural smooth
Use of time	much down time				well organized
Facilities	directed towards teacher, unchanging				flexible changed frequently

Secondary Science Teaching Analysis Matrix
J. Gallagher & J. Parker
May 1995 © Revised August 1995

CONTENT

A Didactic	B Transitional	C Conceptual	D Early Constructivist	E Experienced Constr.	F Constructivist Inquiry
• Factual content, *factoids*	• Content tends to be *descriptive* with concepts and factoids given equal emphasis	• Content tends to be *explanatory* with conceptual content organized around key ideas	• Teacher and students negotiate understanding of *key ideas* with teacher's content emphasized	• Teacher and students negotiate understanding of *key ideas* based in students' ideas & content	• *Investigations* dominate content. Conceptual content and connections embedded into design, implementation, analysis, and report of investigation
• No examples or interconnections to: a) real world events b) related ideas c) key ideas of the subject	• Real world examples and/or related ideas separate from other pieces of content	• Examples and connections made by teacher to: a) real world events b) related ideas c) key ideas of the subject	• Teacher leads students in using examples and constructing connections to: a) real world events b) related ideas c) key ideas of concept	• Connections constructed by students with teacher's guidance to: a) real world b) related ideas c) key ideas of concept	• Connections constructed by students are related to investigation, data analysis, and concept building
• Over simplified so that the limits or exceptions within content are not presented. Many statements are absolutes without qualifiers.	• Some limits, exceptions, and alternate interpretations included, but are not integrated with other content.	• Limits, exceptions, and alternate interpretations are presented as part of the content	• Teacher leads students to identify limits and exceptions that may generate alternate ways of representing or interpreting observations and events	• Teacher and students identify limits and exceptions that may generate alternate ways of representing or interpreting observations and events	• Teacher and students identify limits, exceptions, and alternate interpretations by applying knowledge to part of problem solving
• No explicit mention of how we know. Scientific method is presented separately as rote procedure	• No explicit mention of how we know. Processes of science (observation, inference, experiment, etc.) are not integrated with content	• "How we know" included in content. Teacher integrates processes of science with concepts.	• Teacher leads students to reconstruct how evidence has been used to formulate scientific ideas and to use scientific processes to formulate and evaluate ideas	• Students, with teacher's guidance, reconstruct how evidence has been used to formulate scientific ideas and to use scientific processes to formulate and evaluate ideas	• Processes of science applied to design of project investigation, data collection, data analysis, and concept building

Secondary Science Teaching Analysis Matrix
J. Gallagher & J. Parker
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TEACHER'S ACTIONS AND ASSESSMENT

A Didactic	B Transitional	C Conceptual	D Early Constructivist	E Experienced Constr.	F Constructivist Inquiry
• 1 or 2 teaching teacher-centered methods predominate	• 3 or 4 teacher-centered teaching methods, including some hands-on	• Rich repertoire of teacher-centered teaching methods, including hands-on	• Some use of student-centered methods such as group work, student writing, discussion, and concept mapping.	• Extensive use of student-centered methods	• Project method with teacher and students selecting methods of inquiry and analysis, guided by questions being investigated
• Demonstrations, labs, and hands-on activities are rare	• Some demonstrations, labs, or hands-on activities which are either overly directed (cookbook) or undirected (e.g. exploration without follow up)	• Many demonstrations, labs, or hands-on activities that are conceptually focused. "Answers" generally known ahead of time	• Investigations, demonstrations, and hands-on activities lead by teacher and incorporate some students' ideas	• Investigations, demonstrations, and hands-on activities are constructed by teacher and students and build on students' ideas	• Demonstrations and hands-on activities are part of longer term investigations. Students have a high degree of input in generating question and planning investigation
• Little teacher-student interaction about subject matter (chalk and talk)	• Teacher-student interaction about correctness of students' ideas about unconnected facts	• Teacher-student interaction about correctness of students' knowledge of conceptual content	• Teacher-student interaction about clarification and usefulness of students' ideas and understanding is teacher-directed	• Students & teacher have input into the clarification and usefulness of students' ideas and understandings	• Teacher- student interaction focused on investigations with topics and goals of inquiries often determined by students.
• Teacher's questions call for factual recall	• Teacher's questions directed towards scientific ideas, not towards connections or applications They do not build on students' responses.	• Teacher's questions are directed towards knowledge of scientific concepts and their connections and applications. They do not build on students' responses.	• Teacher's questions are goal-oriented and occasionally emerge from students' responses. They are used to clarify students' ideas.	• Teacher's questions are goal-oriented and frequently emerge from students' responses. They are used to clarify students' ideas.	• Teacher's questions are goal-oriented, emerge from student's responses, and are used to guide investigations
• Tests and quizzes only	• Occasional checking, in addition to tests & quizzes, of students' knowledge	• Frequent checking, in addition to tests & quizzes, of students' knowledge	• Multiple forms. Some assess students' knowledge. Some assess students' understanding.	• Multiple forms. Most assess students' understanding.	• Multiple forms arising from investigations and presentations.
• None	• Checking students' knowledge	• Checking students' knowledge and preplanning	• To guide teacher in adjusting activities.	• To guide teacher and students in adjusting and carrying out activities	• To guide teacher and students in making adjustments in investigations and analysis
• Teacher disregards students ideas about subject matter	• Teacher may accept all students' ideas. Teacher views students' unscientific ideas as oddities.	• Teacher investigates students' ideas about subject matter and works to alter "unscientific" ideas	• Teacher occasionally seeks students' ideas and considers them in instructional decision making this information some of the time in designing activities	• Teacher actively seeks student's ideas. Assessment drives instructional decision making.	• Treats students as self-directed learners and interacts as co-investigator

Secondary Science Teaching Analysis Matrix
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STUDENTS' ACTIONS

A Didactic	B Transitional	C Conceptual	D Early Constructivist	E Experienced Constr.	F Constructivist Inquiry
• Writing and other representations of ideas not used. Short answers predominate	• Writing and other representations of ideas rarely used. Most are reconfigurations of information provided.	• Several forms of writing and other representation of ideas are used. Most are reconfigurations of information provided.	• Students occasionally use writing and other representations of ideas as part of developing their understanding and constructing meaning. Much is reconfiguring information provided.	• Students frequently use writing and other representations of ideas as part of developing their understanding and constructing meaning	• Students choose from a variety of forms of writing and other representations of ideas as part of developing their understanding and constructing meaning
• Few student questions	• Student questions clarifying procedures dominate. Some questions ask for clarification of terminology or repeat of information	• Student questions focus on clarification of meaning related to specific concepts or procedure	• Some student questions focus on clarification of meaning related to specific concepts. Some address key ideas, their connections and applications. Few are procedural.	• Student questions address key ideas, their connections and applications	• Student questions address key ideas, their connections and applications in the context of a long-range, investigative framework
• Student-student interaction is rare.	• Some student-student interaction, mostly about procedure	• Some student-student interaction about procedure. Some about articulating scientific ideas correctly	• Some student-student interaction directed toward understanding and applying scientific ideas. Some about procedure	• Student-student interaction directed toward understanding and applying scientific ideas. Students are self-reliant	• Student-student interaction is frequent and is directed toward understanding and planning. Students are very self-reliant
• Students rarely volunteer examples or analysis	• Students volunteer a few examples, but connections to class activities may be weak	• Students volunteer some examples related to class activities	• Students volunteer analysis as well as examples. Some are related to class activities. Others are weakly related.	• Students volunteer analysis as well as examples. Most are pertinent to class activities	• Students volunteer analysis and examples that are used in setting the direction of the class
• Students are passive or ignore teacher's procedures	• Students show confusion over procedures	• Students accept procedures and role	• Students demonstrate some frustrations with role. For example, "Why doesn't the teacher just tell me the answer?"	• Students do some negotiating with teacher of procedures and role	• Students help define their role in the investigation

Secondary Science Teaching Analysis Matrix
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RESOURCES

A Didactic	B Transitional	C Conceptual	D Early Constructivist	E Experienced Constr.	F Constructivist Inquiry
• Little beyond single text or format	• Text and small number of other resources, including some hands-on	• Multiple resources, i.e. visual aids, videos, manipulatives, laboratory materials, technology, or people	• Multiple resources i.e. visual aids, videos, manipulatives, laboratory materials, technology, or people	• Multiple resources i.e. visual aids, videos, manipulatives, laboratory materials, technology, or people	• Multiple resources i.e. visual aids, videos, manipulatives, laboratory materials, technology, or people
• Students look at, but do not actively use resources. Resources may not be related to content	• Resources are not related to content	• Resources are related to content and illustrate ideas	• Some resources are used to aid students' understanding and application of ideas	• Many resources are used to aid students' understanding and application of ideas	• Resources are integrated into and arise from investigation
• Access to resources controlled by teacher	• Access to resources controlled by teacher	• Access to resources controlled by teacher, but there is some discussion of access with students	• Access to resources is guided by teacher with some discussion of access with students	• Access to resources is based on teacher/student negotiation	• Access to resources is guided by the investigation question

ENVIRONMENT

A Didactic	B Transitional	C Conceptual	D Early Constructivist	E Experienced Constr.	F Constructivist Inquiry
• Teacher-dominated	• Teacher-controlled. Little sharing of decision making with students.	• Teacher-controlled. Some sharing of decision making with students about use of time.	• Students & teacher make some joint decisions about time and activities	• Students & teacher make many joint decisions about time and activities	• Students & teacher make joint decisions about nature of and procedures for investigation
• Few teaching aids displayed. May not be integrated with content	• Some teaching aids displayed. May not be related to content	• Many teaching aids displayed related to content	• Many teaching aids displayed related to content	• Many teaching aids displayed related to content. Some are made by students	• Many teaching aids displayed derived from investigation
• Few examples of students' work displayed	• Students' work displayed is typically similar for all students (i.e. worksheets or identical models)	• Some variation in students' work displayed	• Students' work displayed, includes some student creations (i.e. original posters, stories, or demos)	• Students' work displayed, includes many student creations (i.e. original posters, stories, or demos)	• Students' work displayed, includes student creations derived from investigation

Example of video portfolio summary

Teacher: USF-210

SUMMARY OF PORTFOLIO

Activity/Transition Timeline

DATE	TAPE	A OR T	START TIME	DESCRIPTION
5/1/96	1	T1	0:00	START UP Talking about activities, homework on volume.
		A1	3:00	Walking around the groups, checking homeworks. Working with problems. Teacher solves some of the problems that were problematic using the day before examples, and using the formula . Students ask questions about the problem: Conceptual and procedural questions. (Topics: Pyramid and cylinder). Lecture with some student interaction.
		T2	14:41	Introducing video about designing container. Giving directions about a project that students have to do.
		A2	17:50	Viewing video. Every-day uses of "volumes". Kinds of containers. Techniques for computing volumes.
		T3	31:12	The End of the video. Asking students what they want to do. Teacher already had an activity for students to design their own container. Giving specifications of the container desired. Begin group work.
		A3	33:40	Students work in groups. Some of them seem to be worried about using "colors" rather than using concepts such as area, volume. Teacher briefly visit each groups. One of the groups seems to go beyond in solving the problem. Now teacher is interacting more with students. Students leave their work with the teacher, and students have to write down questions to the teacher.
		T3	50:00	The End
5/2/96	2	T1	1:18	Starting Up Teacher realized that students did not finish the project.
		A1	3:00	Reminding activities of the day before. Designing the box for the project.. Procedural and conceptual information of how to do the project. Giving more specification
		T2	8:20	Breaking in groups
		A2	9:00	Students began work in their project (in groups). Students and teacher interact about subject-matter. S/S interaction is about the problem too, they are engaged. Students strongly interact with teacher.
		T3	32:00	Finishing the work on the problem, time for presentation.

		A3	32:50	Presentation, Group 1: arithmetic solution, teacher made questions, one person of the group answers. Group 2: one student presents the work, teacher does not agree, but they both (T/S) discussed their result. Group 3: similar solution to other groups, no discussion. Groups 4: different solution, discussion with the teacher a few students made questions.
		T4	48:00	Finishing group presentation.
		A4	49:00	Students got individual papers (questionnaire).
		T5	50:00	The End
5/3/96	3	T1	0:7:00	Giving information and continuing presentations.
		A1	0:8:00	Group 5 presentation. Group came up with different answer, teacher highlights difference, asks about differences. Last group: these students were absent first day of problem. Their answer is different.
		T2	14:20	Presentation finishes
		A2	14:40	Teacher summarizes and compares solutions. Introduces her experience carrying.
		T3	18:25	Transition for recalling information on cylinder, teacher asks about formula. Information on work with manipulative to figure out a formula for a model given. Informing about text with information on problem. Explaining procedure to find formula.
		A3	23:48	Students picking up materials; beginning group work. Teacher is walking around checking on students' work; assisting students.
		T4	45:00	The work in groups finishes
		A5	46:53	Teacher solving problem on overhead projector.
		T6	52:00	Explaining extra-credit work. Giving out and answering questionnaire.
			57:19	End

USF-210
Angela/Fernando (MSU)

SUMMARY OF VIDEO PORTFOLIO

OVERVIEW:

This is a conceptual teacher with several constructivist features. She is confident about her content and her teaching. She is also doing an excellent job in transitions and leading activities. The teacher was not at the center of the class, she uses several students centered activities. She did not have problems with the subject-matter, but she spent three days in a very simple concept. The class did not explore deeper mathematical concepts because of the selection of a very simple concept (volume and area of regular solids).

CONTENT:

1C 1D The structure of the content of this teacher is conceptual and constructivist, she worked with key ideas across her class. 2B 2D Teacher presented examples and connections related to key ideas. 3B 3C 3D Teacher presented examples and limitations with emphasis on the specific problem that students solved. 4 no process & history of mathematics were included.

TEACHER'S ACTIONS:

5D Teacher consistently used student-centered methods, writing, discussion. 6C Some hands-on were used. 6C Hands-on activities were used for answering known "answers" such as the volume of the cone in relation to the cylinder. 7C Teacher-student interaction was correctness of student's answer or procedures. 8A 8C Teacher asked for recalling facts, but she also directs question towards connection in calculating areas, volume using information known. 9C 9D Teacher frequently check students knowledge, some of them were build in student's ideas. 10B 10C Teacher uses assessment for checking Ss' knowledge and sometimes she used that for planning. 11C Teacher works with some students' ideas, but she seems to have the right answer.

STUDENT'S ACTIONS:

12D Early constructivist position because there were a lot of representations based on student's understanding. 13C 13D Students" questions focus on the key ideas of the class, procedural and conceptual. 14C the last two tapes showed some interaction among students about subject matter. 15A Students rarely volunteer examples. Examples were given by the teacher. 16C Students accept their role.

RESOURCES:

17C We see multiple resources such as transparencies, videos, textbooks, manipulative. 18C the uses or resources was related to the subject. 19A Teacher controlled all the resources.

ENVIRONMENT:

20A Teacher dominated all decision. Sometimes she asks them for decision, but she already had the plan. 21C Aids were related to ideas (see 17). 22D In the last two classes we saw students' creation displayed with original solution to the problem of designing a container.

OTHER:

In the first class we did not have information about the interaction in the groups and the interaction between teacher and students, the interaction was inaudible. The last two tapes were better, but they still presented problems.

Salish I Research Project
Checklist for Teacher Measures

Teacher Name ______________________________ School ________________________

Date Completed	Measure
______	Constructivist Learning Environment Survey
______	The Nature and Implications of Science/Mathematics
	SIDESTEP
______	Part I
______	Part II
______	Part III
______	Teachers' Pedagogical Philosophy Interview
	Video Portfolio/Classroom Observation
______	Unit Content Journal
______	Five Daily Journals
______	Three Days Videotaping/Observation
______	Three Days of Student Questions
______	New Teacher Transcript Summary
______	Preservice Program Interview, New Teacher Form

Teacher Data Matrix

A Teacher Data Matrix is a way of organizing and reporting data for each new teacher (see Table I on the following page). The teacher-year (data collected for a teacher in a year) is the unit of analysis. The columns of the matrix are labeled with Teacher Measures (various data sources). The rows of the matrix are labeled with Teacher Features (aspects of teaching). Labels used for Teacher Measures are TPPI, SIDESTEP, Video Portfolio, and Teacher CLES. The last column represents row summaries and is labeled, Summary Across All Teacher Measures. Here the researcher triangulates data across all measures for a particular teacher feature and writes a summary paragraph describing patterns regarding that teacher feature.[1] These paragraphs can be used as a basis to label a teacher feature didactic, transitional, conceptual, early constructivist, experienced constructivist. or constructivist inquiry These are the Level 2 categories from the TPPI Super Code scheme contained in this package (and correspond with the STAM). A teacher feature may also be labeled teacher centered, conceptual, or student centered. These are the Level 3 categories from the TPPI Super Code scheme. If the row summaries were combined, one could choose from the same labels and write a grand summary paragraph to describe an overall impression of the teacher's performance. An example of a row summary follows the table titled "Components of the Teacher Data Matrix".

Labels used for the rows of Teacher Features are (1) Teacher and Content, (2) Teacher Actions, (3) Student Actions, (4) Resources, (5) Environment, (6) Context, (7) Teacher's Philosophy of Teaching and Learning, (8) Teacher Response to Student Diversity, (9) Self as Teacher. The summary paragraphs for each feature, written when using the coding schemes for the TPPI and Video Portfolio, are entered into the appropriate cells. Descriptive paragraphs are now written about SIDESTEP data and entered into the rows in this matrix. Numerical data from the teacher's CLES are entered in rows of the CLES column.

As noted above, a Teacher Data Matrix facilitates triangulating data across data sources for each teacher feature and can be used to create an overall impression of a teacher by combining the row summaries. In addition, these matricies describing individual teachers facilitate comparisons among teachers who went through the same program, and comparisons among teachers across programs at an institution, or across institutions, and across teacher-years of data.

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[1] These paragraphs are several levels of analysis away from the original data. A researcher can trace the steps used to generate any summary paragraph by reading the cells in the matrix. (This might be desirable when confirming interpretations).

Table I

Components of the Teacher Data Matrix

Teacher data sources/ Teacher features	TPPI	SIDESTEP	VIDEO PORTFOLIO	TEACHER CLES SCORES	SUMMARY ACROSS ALL TEACHER MEASURES
1. Teacher andContent	Response to 10. 11. 12. 14. 15. 17. 28. 34. 35	na	STAM items 1-4. also accuracy of content. history of mathematical/scientific ideas. and trnasitions from back page of STAM.	CLES subscale scores to include: MU/SU PR	All cells in this column represent a summary paragraph for each teacher feature across all relevant data sources (*row summaries*).
2. Teacher Actions	18.19.23. 24. 33. 38	Part II # 3. 4. 5. 16	STAM items 5-11. also Transitions and use of time from back page of STAM.	PR CV SC	
3. Student Actions	29. 30. 31. 32. 35	na	STAM items 12-16	PR CV SC	
4. Resources	na	Part II # 10. 11	STAM items 17-19	na	
5. Environment	37	na	STAM items 20-22. also Quality of S/T interpersonal interactions from back page of STAM.	SN	
6. Context	25	Part II # 1,2,4a. 5a. 6. 12. 18 Part III. all items.	Qualty of S/S interactions, student behavior, engagement. and facilities from back page of STAM.	na	
7. Teacher's Philosophy of Teaching/ Learning	6. 7. 8. 9. 13. 15. 16. 20. 21. 22. 29. 30. 31. 32. 34. 35	Part II # 17	na	na	
8. Teacher's Response to Student Diversity	38	Part II # 3. 4b. 5b	Diversity Scale	na	
9. Self as Teacher	3. 4. 39. 40. 41	Part II # 7. 8. 9. 113. 14. 15	na	na	

na= not applicable

Teacher Outcomes
Teacher and Content Matrix
Teacher ID USF 1043

TPPI	SS	VP	CLES NT	SUMMARY
Comments made by this teacher related to teacher and content fall into the categories of TRANSITIONAL and EARLY CONSTRUCTIVIST. The comments indicated that the teacher believed that STUDENTS SHOULD SEE REAL WORLD MATH APPLICATIONS, and that STUDENTS SHOULD SEE SCIENCE AS THEMATIC. These were indicative of a TRANSITIONAL TEACHER. The teacher's belief that students SHOULD SEE SCIENCE AS DOABLE is indicative of EARLY CONSTRUCTIVISM.	N/A	1C. The teacher's content is very explanatory. 2C, 2D. Examples and connections are made and led by the teacher and are integrated in the content. 3C. Tensions and exceptions are integrated in the content. 4A, 4D. The processes of science are not integrated and are led by the teacher using a rote scientific method to formulate ideas.	PR 23 SU 24	The comments on the TPPI indicated that the teacher believed that STUDENTS learn mathematics and science through REAL WORLD APPLICATIONS, and that students should SEE SCIENCE AS THEMATIC. The video reveals concrete instances of concepts being presented thematically. These were indicative of a TRANSITIONAL teacher. The video observation is consistent with this. The teacher's CONTENT was observed as EXPLANATORY. EXAMPLES and connections are made and led by the teacher and are INTEGRATED in the content. This teacher INTEGRATED TENSIONS AND EXCEPTIONS in the content, this teacher was purposeful in bringing out limitations and practical applications of theory. Relevant teacher CLES scores were: PR 23 SU 24 These data are suggestive of a CONCEPTUAL classroom with regard to content.

Salish I Research Project
Standard Operating Procedures
Student Measures

Shown below are the standard operating procedures for each of the student measures. All of these measures should be administered to the same class. **Scoring guidelines follow each of these measures.**

Constructivist Learning Environment Survey

CLES should be administered between the fifth and seventh months of the school year, close to the time the class is videotaped. It takes approximately 30 minutes to complete. The following directions should be read by the classroom teacher before the students fill out CLES:

> "For each of the following statements, fill in the circle that best represents your feelings about this class. Please consider each item carefully and answer every item. None of your answers will influence your grade in this class. However, your class is one of 200 classes in the United States that will be compared in this study."

When the teacher picks up the students' papers, she/he should tell them, "Thank you for helping me."

GOALS

See the GOALS section of this package

The Nature and Implications of Science/Mathematics

This instrument should be administered during the first month (preferably during the first two weeks of the class) and again during the eight month of the school year (not too close to the final exam period). It will take about 15 minutes each time it is administered. Before this measure is administered, the following directions should be read by the classroom teacher:

> "For each of the following statements, fill in the circle that best represents your opinion about the statement. Please consider each item carefully and answer every item. None of your answers will influence your grade in this class. However, your class is one of 200 classes in the United States that will be compared in this study."

When the teacher picks up the students' papers, she/he should tell them, "Thank you for helping me."

Student Information Sheet

This measure should be the first one filled out, sometime during the first month of the school year. It will take approximately 5 minutes to complete. The classroom teacher should read the following directions before this instrument is administered:

"Please fill in all of the blanks ABOVE the double line completely and accurately. If you have any questions about any of these items, please ask me."

"This information is being gathered for a nationwide research group called the Salish Research Project. You will not place your name on any of the questionnaires. However, your answers to these questions are very important. Your class is one of 200 in the United States that will be compared in this study."

When the teacher picks up the students' papers, she/he should tell them, "Thank you for helping me."

(If GOALS is to be used by the teacher for grading purposes, read the following paragraph.)

"The only Salish instrument that I will use for your grade in this class is GOALS, a standardized achievement test in mathematics/science. The other instruments will not be used for grading."

(If GOALS is not to be used by the teacher for grading purposes, read the following sentence.)

"The instruments you will be completing for the Salish Project will not be used for grading purposes in this or in any of your other classes."

Student Questions

The **Student Questions** should be given at the end of each of the three classes being videotaped. It takes about 5-7 minutes for students to answer these questions.

The following directions should be read by the classroom teacher:

"I would like you to give me some information about today's class. What you say is very important to me. Please take a minute to think through your answers."

When the teacher picks up the students' papers, she/he should tell them, "Thank you for helping me."

Salish I Research Project
Constructivist Learning Environment Survey[1]
Mathematics Student Form

Date ____________________ Course Title/Period ____________________

Student Number ____________ Teacher Name ____________________

Directions: For each statement, fill in the circle that best describes your feelings about your mathematics teacher.

In this class ...		Almost Always	Often	Sometimes	Seldom	Almost Never
1.	I learn about the world outside of school.	0	0	0	0	0
2.	I learn that mathematics cannot provide perfect answers to problems.	0	0	0	0	0
3.	It's OK to ask the teacher "Why do we have to learn this?"	0	0	0	0	0
4.	I help the teacher to plan what I'm going to learn.	0	0	0	0	0
5.	I get the chance to talk to other students.	0	0	0	0	0
6.	I look forward to the learning activities.	0	0	0	0	0
7.	New learning starts with problems about the world outside of school.	0	0	0	0	0
8.	I learn how mathematics has changed over time.	0	0	0	0	0
9.	I feel free to question the way I'm being taught.	0	0	0	0	0
10.	I help the teacher decide how well my learning is going.	0	0	0	0	0
11.	I talk with other students about how to solve problems.	0	0	0	0	0
12.	The activities are among the most interesting at this school.	0	0	0	0	0
13.	I learn how mathematics can be a part of my out-of-school life.	0	0	0	0	0

(continued)

[1]Adapted from *Constructivist Learning Environment Survey*, P. Taylor, B. Fraser, & L. White, Curtin University of Technology.

In this class ...		Almost Always	Often	Sometimes	Seldom	Almost Never
14.	I learn how the rules of mathematics were invented.	0	0	0	0	0
15.	It's OK to complain about activities that are confusing.	0	0	0	0	0
16.	I have a say in deciding the rules for classroom discussion.	0	0	0	0	0
17.	I try to make sense of other students' ideas.	0	0	0	0	0
18.	The activities make me interested in mathematics.	0	0	0	0	0
19.	I get a better understanding of the world outside of school.	0	0	0	0	0
20.	I learn about the different forms of mathematics used by people in other cultures.	0	0	0	0	0
21.	It's OK to complain about anything that stops me from learning.	0	0	0	0	0
22.	I have a say in deciding how much time I spend on an activity.	0	0	0	0	0
23.	I ask other students to explain their ideas.	0	0	0	0	0
24.	I enjoy the learning activities.	0	0	0	0	0
25.	I learn interesting things about the world outside of school.	0	0	0	0	0
26.	I learn that mathematics is only <u>one</u> of the many ways of understanding the world.	0	0	0	0	0
27.	I'm free to express my opinion.	0	0	0	0	0
28.	Other students ask me to explain my ideas.	0	0	0	0	0
29.	I feel confused.	0	0	0	0	0
30.	What I learn has nothing to do with my out-of-school life.	0	0	0	0	0
31.	I learn that today's mathematics is different from the mathematics of long ago.	0	0	0	0	0

(continued)

In this class ...		Almost Always	Often	Sometimes	Seldom	Almost Never
32.	It's OK to speak up for your rights.	0	0	0	0	0
33.	I have a say in deciding what will be on the test.	0	0	0	0	0
34.	Other students explain their ideas to me.	0	0	0	0	0
35.	The learning activities are a waste of time.	0	0	0	0	0
36.	I have a say in deciding what activities I do.	0	0	0	0	0
37.	What I learn has nothing to do with the world outside of school.	0	0	0	0	0
38.	I learn that mathematics is about inventing rules.	0	0	0	0	0
39.	I feel unable to complain about anything.	0	0	0	0	0
40.	I have a say in deciding how my learning is assessed.	0	0	0	0	0
41.	Other students pay attention to my ideas.	0	0	0	0	0
42.	I feel tense.	0	0	0	0	0

Salish Research Project
Constructivist Learning Environment Survey
Scoring Guidelines for the Mathematics Student Form, 1994-95 Version

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Almost Always" to "Almost Never." For **positive** item statements, the "Almost Always" choice would receive a 5 moving on down to the "Almost Never" choice which would receive a 1. For **negative** item statements, the numbering procedure is reversed.

Example:

		Almost Always	Often	Sometimes	Seldom	Almost Never
	In this class...					
(+)1.	I learn about the world outside of school.	0 5	X 4	0 3	0 2	0 1
(-)2.	what I learn has nothing to do with the world outside of school.	0 1	X 2	0 3	0 4	0 5

Sample item one would be scored as a 4 while sample item two would be scored as a 2. The total score would be 4 + 2 = 6, in this example.

I. PERSONAL RELEVANCE SCALE (PR)

This scale is concerned with students' experience of the personal relevance of school mathematics. The scale has been designed to measure the extent to which students perceive the relevance of school mathematics to their out-of-school lives. From a constructivist perspective, the classroom environment should not promote a discontinuity between school mathematics and students' out-of-school lives by evoking an abstract and decontextualized image of mathematics. Rather, the classroom environment should engage students in opportunities:

(1) to experience the relevance of school mathematics to their everyday interests and activities;
(2) to use their everyday experiences as a meaningful context for the development of their formal mathematical knowledge.

Items:

1.	(+)	30.	(-)
7.	(+)	37.	(-)
13.	(+)		
19.	(+)		
25.	(+)		

II. MATHEMATICAL UNCERTAINTY SCALE (MU)

This scale is concerned with students' experience of mathematics as a fallible human activity. The scale has been designed to measure the extent to which students perceive mathematics to be an uncertain and evolving activity that is embedded in a cultural context and that embodies human values and interests. From a constructivist perspective, the classroom environment should not promote the formalist myth of mathematics as a universal mono-cultural activity that is independent of human interests or values, or the Platonic myth of mathematical knowledge as static, independent of human experience, and providing an accurate and certain representation of objective reality (i.e., a correspondence theory of truth). Rather, the classroom environment should be concerned with engaging students in opportunities to learn:
(1) that mathematical knowledge is evolving and is inherently insecure;
(2) that mathematical knowledge is socially and culturally determined;
(3) that mathematical knowledge arises from human experience and values.

Items:

2. (+)
8. (+)
14. (+)
20. (+)
26. (+)
31. (+)
38. (+)

III. CRITICAL VOICE SCALE (CV)

This scale is concerned with students' development as autonomous learners. In particular, the scale has been designed to measure students' perceptions of the extent to which they are able to exercise legitimately a *critical voice* about the quality of their learning activities. From a constructivist perspective, the classroom environment should not favor technical curriculum interest (e.g., *covering the curriculum content)* to an extent that accountability for classroom activities is directed largely towards an external authority. Rather, the teacher should be willing to demonstrate his/her accountability to the class by fostering students' critical attitudes towards the teaching and learning activities. This can be achieved by creating a social climate in which students feel that it is legitimate and beneficial:
(1) to question the teacher's pedagogical plans and methods;
(2) to express concerns about any impediments to their learning.

Items:

3. (+)
9. (+)
15. (+)
21. (+)
27. (+)
32. (+)
39. (-)

IV. SHARED CONTROL SCALE (SC)

This scale is concerned with another important aspect of the development of student autonomy, namely students sharing with their teachers control of the classroom learning environment. In particular, the scale has been designed to measure students' perceptions of the extent to which the teacher involves them in the *management* of the classroom learning environment. From a constructivist perspective, students should not be required to adopt the traditional role of compliant recipients of a predetermined pedagogy that is controlled entirely by the teacher. Rather, the teacher should invite students to share control of important aspects of their learning by providing opportunities for them to participate in the processes of:
(1) designing and managing their own learning activities;
(2) determining and applying assessment criteria,
(3) negotiating the social norms of the classroom.

Items:

4. (+)
10. (+)
16. (+)
22. (+)
33. (+)
36. (+)
40. (+)

V. STUDENT NEGOTIATION SCALE (SN)

This scale is concerned with negotiation amongst students. The scale has been designed to measure students' perceptions of the extent to which they interact verbally with other students for the purpose of building their mathematical knowledge within the consensual domain of the classroom. From a constructivist perspective, the classroom environment should not require students to learn in social isolation from other students or to regard the teacher or textbook as the main arbiter of what counts as viable mathematical knowledge. Rather, the classroom environment should be concerned with engaging students in opportunities:
(1) to explain and justify their newly developing ideas to other students;
(2) to make sense of other students' ideas and reflect on the viability of their ideas;
(3) to reflect critically on the viability of their own ideas.

Items:

5. (+)
11. (+)
17. (+)
23. (+)
28. (+)
34. (+)
41. (+)

VI. ATTITUDE SCALE (AT)

This scale has been included to provide a measure of the concurrent validity of the CLES. The attitude scale has been used extensively in research on science laboratory classes, and has an established reliability. The scale measures student attitudes to important aspects of the classroom environment, including:
(1) their anticipation to the activities;
(2) their sense of worthwhileness of the activities;
(3) the impact of the activities on student interest, enjoyment and understanding.

Items:

6.	(+)	29.	(-)
12.	(+)	35.	(-)
18.	(+)	42.	(-)
24.	(+)		

Salish I Research Project
Constructivist Learning Environment Survey[2]
Science Student Form

Date ______________________ Course Title/Period ______________________

Student Number ______________ Teacher Name ______________________

Directions: For each statement, fill in the circle that best describes your feelings about your science teacher.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
1.	I learn about the world outside of school.	0	0	0	0	0
2.	I learn that scientific theories are human inventions.	0	0	0	0	0
3.	It's OK to ask the teacher "Why do we have to learn this?"	0	0	0	0	0
4.	I help the teacher to plan what I'm going to learn.	0	0	0	0	0
5.	I get the chance to talk to other students.	0	0	0	0	0
6.	I look forward to the learning activities.	0	0	0	0	0
7.	New learning starts with problems about the world outside of school.	0	0	0	0	0
8.	I learn that science is influenced by people's values and opinions.	0	0	0	0	0
9.	I feel free to question the way I'm being taught.	0	0	0	0	0
10.	I help the teacher decide how well my learning is going.	0	0	0	0	0
11.	I talk with other students about how to solve problems.	0	0	0	0	0
12.	The activities are among the most interesting at this school.	0	0	0	0	0
13.	I learn how science can be a part of my out-of-school life.	0	0	0	0	0

(continued)

[2]Adapted from *Constructivist Learning Environment Survey*, P. Taylor, B. Fraser, & L. White, Curtin University of Technology.

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
14.	I learn that the views of science have changed over time.	0	0	0	0	0
15.	It's OK to complain about activities that are confusing.	0	0	0	0	0
16.	I have a say in deciding the rules for classroom discussion.	0	0	0	0	0
17.	I try to make sense of other students' ideas.	0	0	0	0	0
18.	The activities make me interested in science.	0	0	0	0	0
19.	I get a better understanding of the world outside of school.	0	0	0	0	0
20.	I learn that different sciences are used by people in other cultures.	0	0	0	0	0
21.	It's OK to complain about anything that stops me from learning.	0	0	0	0	0
22.	I have a say in deciding how much time I spend on an activity.	0	0	0	0	0
23.	I ask other students to explain their ideas.	0	0	0	0	0
24.	I enjoy the learning activities.	0	0	0	0	0
25.	I learn interesting things about the world outside of school.	0	0	0	0	0
26.	I learn that scientific knowledge can be questioned.	0	0	0	0	0
27.	I'm free to express my opinion.	0	0	0	0	0
28.	Other students ask me to explain my ideas.	0	0	0	0	0
29.	I feel confused.	0	0	0	0	0
30.	What I learn has nothing to do with my out-of-school life.	0	0	0	0	0
31.	I learn that science reveals the secrets of nature.	0	0	0	0	0

(continued)

	In this class ...	Almost Always	Often	Sometimes	Seldom	Almost Never
32.	It's OK to speak up for your rights.	0	0	0	0	0
33.	I have a say in deciding what will be on the test.	0	0	0	0	0
34.	Other students explain their ideas to me.	0	0	0	0	0
35.	The learning activities are a waste of time.	0	0	0	0	0
36.	I have a say in deciding what activities I do.	0	0	0	0	0
37.	What I learn has nothing to do with the world outside of school.	0	0	0	0	0
38.	I learn that scientific knowledge is beyond doubt.	0	0	0	0	0
39.	I feel unable to complain about anything.	0	0	0	0	0
40.	I have a say in deciding <u>how</u> my learning is assessed.	0	0	0	0	0
41.	Other students pay attention to my ideas.	0	0	0	0	0
42.	I feel tense.	0	0	0	0	0

Salish Research Project
Constructivist Learning Environment Survey
Scoring Guidelines for the Science Student Form, 1994-95 Version

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Almost Always" to "Almost Never." For **positive** item statements, the "Almost Always" choice would receive a 5 moving on down to the "Almost Never" choice which would receive a 1. For **negative** item statements, the numbering procedure is reversed.

Example:

		Almost Always	Often	Sometimes	Seldom	Almost Never
	In this class...					
(+)1.	I learn about the world outside of school.	0 5	X 4	0 3	0 2	0 1
(-)2.	what I learn has nothing to do with the world outside of school.	0 1	X 2	0 3	0 4	0 5

Sample item one would be scored as a 4 while sample item two would be scored as a 2. The total score would be 4 + 2 = 6, in this example.

I. PERSONAL RELEVANCE SCALE (PR)

This scale is concerned with students' experience of the personal relevance of school science. The scale has been designed to measure the extent to which students perceive the relevance of school science to their out-of-school lives. From a constructivist perspective, the classroom environment should not promote a discontinuity between school science and students' out-of-school lives by evoking an abstract and decontextualized image of science. Rather, the classroom environment should engage students in opportunities:
(1) to experience the relevance of school science to their everyday interests and activities;
(2) to use their everyday experiences as a meaningful context for the development of their formal scientific knowledge.

Items:

1.	(+)	30.	(-)
7.	(+)	37.	(-)
13.	(+)		
19.	(+)		
25.	(+)		

II. SCIENTIFIC UNCERTAINTY SCALE (SU)

This scale is concerned with students' perceptions of science as a fallible human activity. The scale has been designed to measure the extent to which students perceive science to be an uncertain and evolving activity embedded in a cultural context and embodying human values and interests. From a constructivist perspective, the classroom environment should not promote: (1) a *scientistic view* of science as a supreme universal mono-cultural activity that is independent of human interests and values; or (2) the *objectivist* myth that science provides an accurate and certain representation of objective reality (i.e., a correspondence theory of truth). Rather, the classroom environment should be concerned with engaging students in opportunities to learn to be skeptical and criti cal about the nature and value of science. In particular, to learn:
(1) that scientific knowledge is evolving and provisional;
(2) that scientific knowledge is shaped by social and cultural influences;
(3) that scientific knowledge arises from human interests and values.

Items:

2.	(+)	31.	(-)
8.	(+)	38.	(-)
14.	(+)		
20.	(+)		
26.	(+)		

III. CRITICAL VOICE SCALE (CV)

This scale is concerned with students' development as autonomous learners. In particular, the scale has been designed to measure students' perceptions of the extent to which they are able to exercise legitimately a *critical voice* about the quality of their learning activities. From a constructivist perspective, the classroom environment should not favor technical curriculum interest (e.g., *covering the curriculum content)* to an extent that accountability for classroom activities is directed largely towards an external authority. Rather, the teacher should be willing to demonstrate his/her accountability to the class by fostering students' critical attitudes towards the teaching and learning activities. This can be achieved by creating a social climate in which students feel that it is legitimate and beneficial:
(1) to question the teacher's pedagogical plans and methods;
(2) to express concerns about any impediments to their learning.

Items:

3.	(+)	39.	(-)
9.	(+)		
15.	(+)		
21.	(+)		
27.	(+)		
32.	(+)		

IV. SHARED CONTROL SCALE (SC)

This scale is concerned with another important aspect of the development of student autonomy, namely students sharing with their teachers control of the classroom learning environment. In particular, the scale has been designed to measure students' perceptions of the extent to which the teacher involves them in the *management* of the classroom learning environment. From a constructivist perspective, students should not be required to adopt the traditional role of compliant recipients of a predetermined pedagogy that is controlled entirely by the teacher. Rather, the teacher should invite students to share control of important aspects of their learning by providing opportunities for them to participate in the processes of:
(1) designing and managing their own learning activities;
(2) determining and applying assessment criteria,
(3) negotiating the social norms of the classroom.

Items:

4. (+)
10. (+)
16. (+)
22. (+)
33. (+)
36. (+)
40. (+)

V. STUDENT NEGOTIATION SCALE (SN)

This scale is concerned with negotiation amongst students. The scale has been designed to measure students' perceptions of the extent to which they interact verbally with other students for the purpose of building their scientific knowledge within the consensual domain of the classroom. From a constructivist perspective, the classroom environment should not require students to learn in social isolation from other students or to regard the teacher or textbook as the main arbiter of what counts as viable scientific knowledge. Rather, the classroom environment should be concerned with engaging students in opportunities:
(1) to explain and justify their newly developing ideas to other students;
(2) to make sense of other students' ideas and reflect on the viability of their ideas;
(3) to reflect critically on the viability of their own ideas.

Items:
5. (+)
11. (+)
17. (+)
23. (+)
28. (+)
34. (+)
41. (+)

VI. ATTITUDE SCALE (AT)

This scale has been included to provide a measure of the concurrent validity of the CLES. The attitude scale has been used extensively in research on science laboratory classes, and has an established reliability. The scale measures student attitudes to important aspects of the classroom environment, including:
(1) their anticipation to the activities;
(2) their sense of worthwhileness of the activities;
(3) the impact of the activities on student interest, enjoyment and understanding.

Items:

6.	(+)	29.	(-)
12.	(+)	35.	(-)
18.	(+)	42.	(-)
24.	(+)		

Salish I Research Project
GOALS

Standard Operating Procedures

Ordering Information

A. Order GOALS by mail or fax from The Psychological Corporation using the special order form they will provide you. To receive this order form, contact PSYCORP at 1-800-228-0752.

B. Orders these forms early enough so the pretest can be given early in the semester or school year. It should take between one and one-half and three weeks from the time that The Psychological Corporation receives your order until delivery by UPS, so plan accordingly.

GOALS should be administered in the second and again in the eighth month of the school year (adjust this time table accordingly if a 1 semester course or block scheduled course is involved).

C. Tests come in packages of 25 per grade level. For students in Grade 5, order Level 5; for Grade 6, order Level 6, etc. For students in Grade 12, order Level 11, as there is no Level 12.

Directions for Researchers

A. With each test booklet, provide:

1. a Student Demographic/Score Sheet, and
2. a Number 2 pencil needed to fill out the Student Demographic/Score Sheet.

B. For each New Teacher, provide:

1. a "Teacher Directions for GOALS" form, found on the next page;
2. a "Sample Student Demographic/Score Sheet," enclosed with this package;
3. a "Sample Back Cover," enclosed with this package; and
4. a Directions for Administering booklet, which comes with each package of 25 test booklets.

Salish I Research Project
Teacher Directions for GOALS

Overview

GOALS is a performance-based measure of student achievement which is comprised of open-ended questions. The main emphasis of GOALS is on explanation: students are required to support or justify the answers they give. Therefore, it measures both thinking skills and content knowledge.

Directions for Administration

A. GOALS should be administered in the second and again in the eighth month of the school year. The time required for administration is approximately 30 minutes or one class period.

B. All information needs to be filled out with a Number 2 pencil.

C. The following information should be filled out on the Student Demographic/Score Sheet.

4 - Student Number (the Identification Number used by the students on the Student Information Sheet)
5 - Gender
6 - Grade
8 - Test Date, Teacher, and School
9 - Test Form (should be "A") and the student's Test Booklet Number found on the back page of the test booklet. Place this information on the grid for the topic being measured, mathematics or science. If no number is printed on the back of the test booklet, please place a unique number on each booklet before giving them to the students.

See the "Sample Student Demographic/Score Sheet" provided.

D. The following information should be filled out on the back of the test booklet.

Student Number in the "name" field (the same one used on the Demographic Sheet)
Teacher Name
Test Date
School Name

See the "Sample Back Cover" provided.

E. Read the Directions for Administering booklet from the Psychological Corporation carefully. Follow the directions on page 9 of that booklet to start the students on the test.

Salish I Research Project

GOALS - Interpretation
Student Performance Roster
May, 1996

This document outlines the information found on the Student Performance Roster containing student scores on GOALS. A sample roster is attached.

Overview of Student Performance Roster

Students	Each student's score report is a separate column of the Student Performance Roster.
Level/Form	The grade level and form of the test administered is shown for each student. In the sample roster shown, the class is 12th grade. They were administered Level 11 (the highest level) and form A of the test.
Scale/Cluster Scores	The scales are called clusters. A list of scales for the mathematics and science domain is shown below. Student 20441 received 7 out of 12 possible points on the Life Science Scale. This student was assigned a performance indicator of 2. Performance indicators range from 0 to 3.
Overall Performance	Student 20441 received an overall performance indicator of 2, receiving 19 out of a possible 30 points. The student ranked at the 79th percentile on the Science Domain with a stanine of 7. (Stanines go from 0 to 9.)

List of Scales

<u>Science Domain</u>

Content

1. Life Science
2. Physical Science
3. Earth/Space Science

Process

1. Collecting and Recording Scientific Data
2. Applying Science Concepts and Drawing Conclusions

<u>Mathematics Domain</u>

Content

1. Problem Solving
2. Procedures

Process

1. Integrating Mathematical Concepts and Skills to Solve Problems - through 8th grade only
2. Analyzing Problems Using Mathematical Skills and Concepts
3. Creating Solutions Through Synthesis of Mathematics Concepts and Skills
4. Evaluating Problems Using Mathematical Skills and Concepts - grades 9-12 only

SCHOOL:
DISTRICT: SALISH PROJECT

GRADE: 12
TEST DATE: 05/95

1988 NORMS: NATIONAL

GOALS GRADE 12 SPRING

STUDENT PERFORMANCE ROSTER FOR

SCIENCE

PAGE 1

NOTE: Clusters and total may include questions that were omitted or unscorable.

SCIENCE	20441	3343	4466	6646
LEVEL/FORM	11/A	11/A	11/A	11/A
CONTENT				
Life Science				
Performance Indicator	2	3	2	2
Raw Score/Number Possible	7/12	10/12	8/12	8/12
Physical Science				
Performance Indicator	2	2	2	2
Raw Score/Number Possible	6/ 9	7/ 9	6/ 9	7/ 9
Earth/Space Science				
Performance Indicator	2	3	2	2
Raw Score/Number Possible	6/ 9	8/ 9	7/ 9	7/ 9
PROCESS				
Collecting and Recording Scientific Data				
Performance Indicator	2	3	3	3
Raw Score/Number Possible	7/ 9	9/ 9	8/ 9	8/ 9
Applying Science Concepts and Drawing Conclusions				
Performance Indicator	2	2	2	2
Raw Score/Number Possible	12/21	16/21	13/21	14/21
OVERALL PERFORMANCE				
Performance Indicator	2	3	2	2
Raw Score/Number Possible	19/30	25/30	21/30	22/30
Natl Percentile Rank-Stanine	79-7	99-9	80-7	93-8

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Salish I Research Project
The Nature and Implication of Mathematics[1]
Student Form

Date ______________________ Course Title/Period ______________________

Student Number ______________ Teacher Name ______________________

Directions: For each statement, fill in the circle that best represents your opinion about the statement. Select one of the following: SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
1.	Mathematics is mostly about performing calculations.	0	0	0	0	0
2.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	0	0	0	0	0
3.	Mathematics is an attempt to know more about the world around us.	0	0	0	0	0
4.	Mathematics involves working with numbers, formulas, and patterns.	0	0	0	0	0
5.	Mathematics and computers offer a great deal of help in solving social problems.	0	0	0	0	0
6.	Any theorem or concept in mathematics can be challenged.	0	0	0	0	0
7.	Mathematics is useless in society.	0	0	0	0	0
8.	Mathematics teaches you how to think through problems.	0	0	0	0	0
9.	Learning mathematics is usually a waste of time.	0	0	0	0	0
10.	Mathematics includes questioning and explaining.	0	0	0	0	0
11.	Knowledge of mathematics and computers helps you personally solve everyday problems.	0	0	0	0	0
12.	Knowing mathematics can improve a person's life.	0	0	0	0	0

(continued)

[1]Adapted from *The Iowa Assessment Handbook;* The University of Iowa, 1993 edition; *Test of Science-Related Attitudes* (TOSRA), developed by Barry J. Fraser, Macquarie University, Sydney, Australia; and *Views on Science-Technology-Society,* 1989, Glen Aikenhead, et al.

		SA	A	N	D	SD
13.	Mathematics classes have given me the confidence to figure things out on my own.	0	0	0	0	0
14.	Mathematics is basically addition, subtraction, multiplication, and division.	0	0	0	0	0
15.	There is always one best way to solve a mathematics problem.	0	0	0	0	0
16.	Fundamental mathematical facts do not change.	0	0	0	0	0

Salish I Research Project
The Nature and Implications of Mathematics

Scoring Guidelines 1995-1996
May, 1996

This instrument consists of both positive and negative statements which NTs and students must answer on a scale that ranges from "Strongly Agree" to "Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+2.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	X	0	0	0	0
		5	4	3	2	1
-7.	Mathematics is useless in society.	X	0	0	0	0
		1	2	3	4	5

Sample Item Two would be scored as a 5 while Sample Item Seven would be scored as a 1.

SCALES

I. The Social Implications of Mathematics/Computers

Item	Sign	
2.	(+)	The Social Implications of Mathematics/ Computers scale score is computed by adding together the scores for items 2, 3, 5, 8, 10, 11, 12, and 13. This scale score will range from 8 to 40. The internal consistency of this scale is .76.
3.	(+)	
5.	(+)	
8.	(+)	
10.	(+)	
11.	(+)	
12.	(+)	
13.	(+)	

II. The Usefulness of Mathematics

Item	Sign	
7.	(-)	The Usefulness of Mathematics scale score is computed by adding together the scores for items 7 and 9. This scale score will range from 2 to 10. The internal consistency of this scale is .71.
9.	(-)	

III. The Nature of Mathematics

Item	Sign	
1.	(+)	The Nature of Mathematics scale score is computed by adding together the scores for items 1, 4, 14, and 15. This scale score will
4.	(+)	
14.	(+)	

15. (+) range from 4 to 20. The internal consistency of this scale is .54.

Salish I Research Project
The Nature and Implications of Mathematics

Scoring Guidelines 1994-1995
Revised March, 1996

This instrument consists of both positive and negative statements which NTs and students must answer on a scale that ranges from "Strongly Agree" to Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+3.	Mathematics deals with activities that affect people's lives at home, in school, and in society.	X 5	0 4	0 3	0 2	0 1
-7.	Mathematics is useless to society.	X 1	0 2	0 3	0 4	0 5

Sample Item Three would be scored as a 5 while Sample Item Seven would be scored as a 1.

Three scale scores should be computed, as shown below:

<u>The Usefulness of Mathematics</u> (I)

7. (-)
9. (-)

The Usefulness of Mathematics score is computed by adding together the scores for items 7 and 9. This score will range from 2 to 10. The internal consistency of this scale is .80.

<u>The Social Implications of Mathematics</u> (II)

3. (+)
4. (+)
5. (+)
11. (+)
12. (+)

The Social Implications of Mathematics score is computed by adding together the scores for items 3, 4, 5, 11, and 12. This score will range from 5 to 25. The internal consistency of this scale is .70.

<u>The Nature of Mathematics</u> (III)

10. (+)
15. (+)
16. (+)

The Nature of Mathematics score is computed by adding together the scores for items 10, 15, and 16. This score will range from 3 to 15. The internal consistency of this scale is .67.

Salish I Research Project
The Nature and Implications of Science/Technology[2]
Student Form

Date ______________________ Course Title/Period ______________________

Student Number ______________ Teacher Name ______________________

Directions: For each statement, fill in the circle that best represents your opinion about the statement. Select one of the following: SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
1.	Science in its basic form means questioning, explaining, and testing.	0	0	0	0	0
2.	Science is the attempt of humans to know more about the world around them.	0	0	0	0	0
3.	Technology is our attempt to manipulate the physical world to solve practical problems.	0	0	0	0	0
4.	Science is limited to working with various objects and materials in classrooms or laboratories.	0	0	0	0	0
5.	Science is frequently humankind's worst enemy.	0	0	0	0	0
6.	Theories and/or basic concepts of science should not be challenged.	0	0	0	0	0
7.	Science is broadly viewed as a way of studying the universe and how it works.	0	0	0	0	0
8.	Technology makes life better for humankind.	0	0	0	0	0
9.	Science offers a way of figuring things out to determine if we understand nature.	0	0	0	0	0
10.	This country is spending too many resources on advancing basic science.	0	0	0	0	0
11.	Science is an activity that should be done in a laboratory.	0	0	0	0	0

(continued)

[2]Adapted from *The Iowa Assessment Handbook*, The University of Iowa, 1993 edition; *Test of Science-Related Attitudes* (TOSRA), developed by Barry J. Fraser, Macquarie University, Sydney, Australia; and *Views on Science-Technology-Society*, 1989, Glen Aikenhead, et al.

		SA	A	N	D	SD
12.	Most scientists care about the potential effects (both helpful and harmful) that could result from their discoveries.	0	0	0	0	0
13.	Conclusions of scientists may change in the future.	0	0	0	0	0
14.	Scientists should be held responsible for the harm that might result from their discoveries.	0	0	0	0	0
15.	Scientific discoveries can best be made through carefully planned experimentation.	0	0	0	0	0
16.	Knowledge of science and technology helps individuals to deal with everyday problems.	0	0	0	0	0
17.	Technology has little to do with scientific investigation.	0	0	0	0	0
18.	Science and technology offer help in resolving social problems.	0	0	0	0	0
19.	Developers of technology should be held responsible for the harm that might result from their efforts.	0	0	0	0	0

Salish I Research Project
The Nature and Implications of Science/Technology

Scoring Guidelines 1995-96

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Strongly Agree" to Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+1.	Science in its basic form means questioning, explaining, and testing.	X 5	0 4	0 3	0 2	0 1
- 4.	Science is limited to working with various objects and materials in classrooms or laboratories.	X 1	0 2	0 3	0 4	0 5

Sample Item One would be scored as a 5 while sample Item Four would be scored at a 1 for a total score of 5 + 1 = 6.

Scales:

Nature of Science (I)

1.	+	9.	+
2.	+	11.	-
4.	-	13.	+
6.	-	15.	+
7.	+		

Nature of Technology (II)

3.	+
17.	-

Social Implications of Science (III)

5.	-	14.	-
10.	-	16.	+
12.	+	18.	+

Social Implications of Technology (IV)

8.	+	18.	+
16.	+	19.	-

Salish I Research Project
The Nature and Implications of Science/Technology

Scoring Guidelines for 1995-96
May, 1996

This instrument consists of both positive and negative statements which students must answer on a scale that ranges from "Strongly Agree" to "Strongly Disagree." For positive item statements, the "Strongly Agree" choice would receive a 5 moving on down to the "Strongly Disagree" choice which would receive a 1. For negative item statements, the number procedure is reversed.

Example:

SA=Strongly Agree; A=Agree; N=Not Sure; D=Disagree; SD=Strongly Disagree.

		SA	A	N	D	SD
+1.	Science in its basic form means questioning, explaining, and testing.	X 5	0 4	0 3	0 2	0 1
- 6.	Science is frequently humankind's worst enemy.	0 1	X 2	0 3	0 4	0 5

Sample Item One would be scored as a 5 while Sample Item Six would be scored as a 2. Three scale scores should be computed, as shown below.

SCALES

I. <u>Harmfulness of Science/Technology</u>

14.	(-)	19.	(-)	The Harmfulness of Science/Technology scale score is computed by adding together the scores for items 14 and 19. This scale score will range from 2 to 10, with lower scores indicating that scientists should be held responsible for harm from their efforts. The internal consistency is .78.

II. <u>The Social Implications of Science</u>

2.	(+)	9.	(+)	The Social Implications of Science scale score is computed by adding together the scores for items 2, 3, 5, 7, 8, 9, 10, 12, 16, and 18. This scale score will range from 10 to 50. The internal consistency of this scale is .61.
3.	(+)	10.	(-)	
5.	(-)	12.	(+)	
7.	(+)	16.	(+)	
8.	(+)	18.	(+)	

III. <u>The Nature of Science</u>

1.	(+)	11.	(-)	The Nature of Science scale score is computed by adding together the scores for items 1, 4, 6, 11, 13, and 17.
4.	(-)	13.	(+)	
6.	(-)	17.	(-)	

This scale score will range from 6 to 30.
The internal consistency of this scale is .55.

Salish I Research Project
Student Information Sheet

Directions: Fill out the information above the double lines.

Date ____________________ Course Title/Period ____________________

School ____________________ Teacher Name ____________________

Student Number ______________ Student Gender: Male ___ Female ________

Grade ______________ Written/Spoken Language ________________

Ethnicity (Circle One): Asian African-American Hispanic/Latino White, Not Hispanic

Native American/Alaskan Native Other (please specify) ________________

For Office Use Only: Record the date completed for each measure or check that they have been completed.

Pretest Scores	Posttest Scores	
_____	_____	GOALS
_____	_____	NISM
	_____	CLES
		Student Questions
	_____	Day 1
	_____	Day 2
	_____	Day 3

Salish I Research Project
Student Questions[3]

Date ______________________ Course Title ___________________________

Student Number ______________ Teacher Name __________________________

1. What do you think your teacher wanted you to learn today (what was the main idea)?

2. List some questions that today's lesson made you want to ask.

3. How is this topic important to you?

[3]Student Outcome Assessment Rubric. Student Questions from *The ESTEEM Manual,* @1993, Judith A. Burry-Stock.

Salish I Research Project
Preservice Program Interviews

Standard Operating Procedures

These interviews should be audiotaped and transcribed; interviewers may want to take notes as well. Researchers should insure that the interviewee is close enough to the microphone to be heard. Some of the questions are stated in terms of "science/mathematics." Researchers should read the discipline appropriate to the person being interviewed. A sample of faculty from the content disciplines and the teacher education program are to be interviewed once during the course of the research project. Likewise for each new teacher. Interviews may be done in person or by telephone.

<u>Faculty Interviews</u>

These interviews should be done by the faculty associate at each site. Faculty interviews should last about 15-30 minutes, although they may be longer if the faculty member expounds at great length. Question 6 on the Teacher Education Faculty Form may be difficult to answer and cause some discomfort to the interviewer and interviewee. To be successful in getting a response, researchers should be sure to give adequate wait time for this question. Faculty responses to Question 1 do provide an initial answer to Question 6, but probing further with this question provided interesting responses in the piloting of the interview protocol.

<u>New Teacher Interview</u>

These interviews may be done by either faculty or research associates. They should average about 25 minutes in length. The interviewees may find Question 19, which asks about the philosophy of the teacher education program in relation to mathematics/science, difficult to respond to. Again, wait time is important. If New Teachers are hard pressed to come up with an answer, this demonstrates their perception of a lack of coherent philosophy in their preservice program, an interesting fact in and of itself.

Coding Scheme for Program Features

Format of Coding Scheme

The following information provides an a priori coding scheme for categorizing data about mathematics/science education programs in this package. One institution's program is the unit of analysis. There are six data sources for program information that need to be coded into a final data package describing a program. These are (a) a program description questionnaire, (b) an interview protocol for mathematics or science faculty, (c) an interview protocol for teacher education faculty, (d) a course syllabus for each mathematics or science course and for each education course, (e) an interview protocol for the new teachers asking for their perceptions of their program, and (f) a college transcript for each new teacher.[4]

Each of the four coding schemes for b through e consists of several pages of hierarchical lists. Collectively, the coding schemes address twenty-one program features. These features emerged from the team's review of several interview transcripts: (1) Admission Requirements, (2) Certification(s), (3) Semester Hour Requirements, (4) Program Purpose/Goals, (5) Philosophy of Mathematics/Science, (6) Philosophy of Teaching, (7) Course Objectives/Audience, (8) Course Instruction, (9) Instructional Resources, (10) Methods of Assessment, (11) Research Experiences, (12) Field Experiences, (13) Course/Program Evaluation, (14) Course/Program Changes, (15) Student Advisement, (16) Student Faculty Relationships, (17) Professional Linkages, (18). Program Relationships and Coherence, (19) Program Structure, (20) Important Experiences, and (21) Prior Career Influences.

The transcripts showing which courses new teachers took in their preservice program (data source f) were used to help researchers identify sources of data to collect. For example, (a) which professors to interview and which syllabi to collect when there were multiple sections of a course, and (b) information from which elective courses would be relevant to the study.

Information from course syllabi (data source d) are used as secondary data sources to provide information, where necessary, to describe program features related to the content faculty and the teacher education faculty. Thus the coding for the course syllabi and the faculty interviews are combined under "... faculty interview/syllabus" on the Program Features Matrix. This is a summary chart of data from different sources.

On the Program Features Matrix (see figure 1 on next page) the program features are listed as labels for rows. The four data sources for which there are hierarchical lists are labels (b-e) for columns. Each of the cells in a column contains one or more upper case letters. Each letter indicates a specific program feature and the set of codes subsumed under that letter. The ampersand under the column headed, "Report", indicates the need to write a summary paragraph that decodes the scheme for a reader and describes emergent themes/patterns across all the data in a row.

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[4] The title of the coding scheme that corresponds to each data source follows: (a) Data Sheet for Describing Formal Program Operated by I[4]nstitution, (b) Preservice Program Interview-Mathematics/Science Faculty Form, (c) Preservice Program Interview-Teacher Education Faculty Form, (d) Syllalbus Analysis Form, (e) Preservice Program Interview-New Teacher Form, and (f) Transcript Analysis Form.

Figure 1
PROGRAM DATA MATRIX

Feature/ Program Data Sources	Program Description	Math/Sci Fac Interview& Syllabus	Teacher Ed Faculty Interview	New Teacher Interview	Report
1. Admission Reqa.	A				&
2. Certification(S)	B,C				&
3. Sh Reqs	D				&
4. Program Purpose/Goals	Prog Desc 94, sec III				&
5. Phil Of Math/Sci		M	M		&
6. Phil. of Teaching		N	N		&
7. Course Obj/Aud		A,B	A,B	A,B,K	&
8. Course Inst.		C	C	C,L	&
9. Instr. Res.		D	D	D,M	&
10. Mthds of Assmt		E	E	E,N	&
11. Res. Exp.		F		F	&
12. Fld. Exp.	E		F	O	&
13. Crs/Prg Eval	G	G	G		&
14. Crs/Prg Chngs		H	H		&
15. St. Advisement	H	J	J		&
16. St/Fac Relat				H,R	&
17. Prof. Linkages		K	K		&
18. Pro. Rel. & Coh.		I,L	I,L	Q	&
19. Prog Structure	F			I,Q,S	&
20. Imp. Exps.				G,P	&
21. Prior Career Info.				U,V	&

&= SUMMARY PARAGRAPH

NOTE: Each cell with a coding scheme identifier should have a summary paragraph that discusses the emergent themes/ paterns across al l interviews for a given data source. The final report will synthesize the emergent themes/patterns by confirming/disconfirming the patterns that exist in the cells across a given row.

Getting Oriented to the Coding Scheme

Step 1. Read responses describing several program transcripts to get an idea of the types of statements respondents made. Be aware that the answers to the questions do not correspond one-to-one with the categories listed in a coding scheme. Answers to several questions may provide insight for one particular feature and its appropriate code. It is necessary, therefore, to read one transcript several times to locate all the items that appear on a coding scheme list. The process of coding is iterative and requires a holistic perspective.

Step 2. Read the descriptors of each category on the appropriate code list. Determine your interpretation of the category (thus the interpretation of the code).

Coding an Interview Transcript

Run one copy of each of the code lists. Read one transcript. Highlight text that appears to be relevant to one or more of the categories on the appropriate list. Then record the code numbers and letters of the category, or categories, related to a highlighted segment in the margin of the transcript. Where you have more than one code for a block of text, be sure to make it clear with lines or arrows which word or phrase stimulated you to place a particular code in that margin. Repeat this process for each transcript within a data source.

(Why would you highlight more than just the specific word, phrase, or sentence that fits into a category? The reason one may be highlighting more than just a phrase or a sentence in a specific paragraph is to preserve the context from which you are inferring a particular meaning and assigning the code. This is important when several people are coding the same material, because it helps researchers compare the types of statements they each used to assign data to a category (code) and reach consensus on codes. When highlighted/coded information gets separated from the original transcript, as it does when one uses a computer program to assist in coding and analysis, it makes the documentation for your interpretations and quotations visible. An option to speed up the next step is to record themes/patterns that begin to emerge while you are coding transcripts in a separate memo to yourself. This memo is used during the writing phase as a guide to the meaning of your data.

Writing Summary "Paragraphs"

Once all the data have been coded, the next step is to organize the coded data for the purpose of writing summary "paragraphs" about each of the twenty-one program features. The matrix in table 1 helps organize the data. Cells in the matrix indicate which sources of data and which sets of codes are relevant to writing a summary paragraph about each program feature. There will be two types of paragraphs written. One reflects the data in a single cell in the Program Features Matrix. The other reflects the data across a single row in the Program Features Matrix. Go to the upper case letter on the appropriate coding scheme list to locate the data relevant to a specific program feature. The language used in the coding schemes should be used to write the paragraphs.

For example, in order to write a summary paragraph about a program's philosophy about mathematics or science, one would look down column one of the matrix to find the program feature titled, "philosophy of mathematiacs/science" (see figure 2 below). It is row 5. Read across row 5 to find the letter(s) representing the set(s) of codes relating to this program feature. In this example, it is M. There are two M's. One is in the column labeled "Math/Sci Faculty Interview & Syllabi". The other is in the column labeled "Teacher Ed. Faculty Interview". Go to M on both coding scheme lists to find the relevant categories and their codes subsumed under the upper case letter. Review each part of the coded transcripts marked with an M. Record all the coded responses related to M from the mathematics/science faculty interview on a card. Decode these responses for a reader by using the language describing each code on the coding scheme list.

Identify the respondent (e.g. biology professor, physics professor, etc.) and write out what the code represents (e.g.M1= body of knowledge). In the "paragraph", describe any themes/patterns or lack of themes/patterns among these responses in a cell. Each cell with a coding scheme identifier should have a summary paragraph that discusses the emergent themes/patterns across all interviews in that cell.

Figure 2

Row 5 of program features matrix

Feature/ Program Data Sources	Program Description	Math/Sci Faculty Interview & syllabi	Teacher Ed. Faculty Interview	New Teacher Interview	Summary
5. Philosophy of Math/Science		M	M		&

If you opted to write memos about emergent themes/patterns while you were coding transcripts, you would use the memos with the step above to look for disconfirming and confirming evidence to support your themes/patterns. You may find that several memos collapse into a single category, or you may need to create other categories to reflect the nature of the emergent themes/patterns. This process is cyclic and may require three or more readings of the coded material to have sufficient confidence that you have sought disconfirming evidence for you final summary "paragraph". Please note in figure 3 that the phrases listed in the gray boxes are what is being titled a summary "paragraph". They are not grammatically correct sentences combined to make a proper paragraph.

Figure 3

Example of writng a program features summary paragraph

Math/Sci Faculty Interview & syllabi	Teacher Ed. Faculty Interview		Summary
Response of physics faculty member X= M02 Fac phil M S process Response of biology faculty member Y= M01 Fac phil M S body know Summary of X + Y= Pattern in these responses is that the responses are inconsistent.	Response of science education faculty member A= M02 Fac phil M S process Response of educational measurements faculty member B= M02 Fac phil M S process Response of educational foundations faculty member B= M02 Fac phil M S process Summary of A, B, &C= a consistent pattern regarding a philosophy of science, i.e. science/math is a process		The math/science faculty responses regarding a philosophy of math/science are not consistent. There seems to be agreement among the teacher ed faculty that math/sci is a process.

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A second paragraph is now written to describe any patterns or lack of patterns about a specific preservice program feature by reading across row 5 responses from both columns, both mathematics/science faculty interviews and education faculty interviews in this example. Write a paragraph combining all the responses across a single row. Spread out your earlier reports for each of the four data sources. Read across the summary paragraphs that correspond to the feature being examined. The summary can be written after several readings. Summary paragraphs are written for each program feature by combining data across a single row. The final report synthesizes the emergent themes/patterns by confirming/disconfirming the patterns that exist in the cells across a given row.

Salish I Research Project
Preservice Program Interview
New Teacher Form

Mathematics/Science Study

1. How would you describe your typical mathematics and/or science course?
   Probe for:
   a. types of objectives, e.g., certain knowledge, specific skills, attitudes towards mathematics/science.
   b. typical instructional strategies, e.g., lecture, labs, projects, seminar discussion, independent research, cooperative learning, etc.
   c. instructional resources, e.g., textbooks, instrumentation, technologies, etc.

2. How were you typically evaluated in mathematics/science courses?
   Probe for:
   a. written tests; b. essays; c. projects; d. oral presentations; e. research performance;
   f. homework assignments; and g. evaluation by peers.

3. How often were cooperative learning techniques used in your mathematics/science courses?

4. Did you take mathematics/science courses different from those taken by students not preparing to teach?

5. How often did you work on actual research projects or in actual research facilities as part of your mathematics/science program?
   Probe for: nature and duration of field experiences.

6. Which mathematics/science courses, or experiences, stand out in your mind as particularly important to you? Why?
   Probe for:
   a. what was learned.
   b. specific instructional strategies.
   c. materials used.
   d. ways of evaluating student learning.
   e. course organization, e.g., cooperative learning.

7. How would you describe the student-faculty relationship in your mathematics/science program?

8. Were you a member of a student cohort when studying mathematics/science?

9. What was the purpose of your mathematics/science study? Did it include teaching as a career?

Teacher Education Study

10. How would you describe your typical teacher education course?
    Probe for:
    a. types of objectives, e.g., certain knowledge, specific skills, attitudes toward mathematics/science or teaching secondary school students.
    b. typical instructional strategies, e.g., lecture, labs, projects, seminar discussion, independent research, cooperative learning, etc.

c. instructional resources, e.g., textbooks, instrumentation, technologies, etc.

11. How were you typically evaluated in teacher education courses?
Probe for:
a. written tests; b. essays; c. projects; d. oral presentations; e. teaching performance;
f. homework assignments; and g. evaluation by peers or faculty.

12. How often were cooperative learning techniques used in your teacher education courses?

13. How would you describe your field experiences?
Probe for:
a. experiences in different schools or school settings.
b. what students did in field experiences.
c. nature of supervision and evaluation.

14. Which courses, or experiences, stand out in your mind as particularly important to you? Why?
Probe for:
a. what was learned.
b. specific instructional strategies.
c. materials used.
d. ways of evaluating student learning.
e. course organization, e.g., cooperative learning.

15. What was the relationship between what you learned in mathematics/science courses, and what you learned in teacher education courses, including your methods courses?

16. How would you describe the student-faculty relationship in your teacher education program?

17. Were you a member of a student cohort in your teacher education program?

18. What was the philosophy of your teacher education program related to (a) mathematics/science education, and (b) mathematics/science teaching?

Career Experience Prior to entering a Teacher Education Program: Only for New Teachers in Alternative Certification Programs, or Returning to Pursue a Teaching Degree or Certification

19. Please describe briefly your professional career between when you obtained an undergraduate degree and when you returned to obtain a teaching degree or certification.

20. How has your prior professional experience contributed to your ability to teach secondary school mathematics and/or science?

Salish I Research Project

Coding Scheme for New Teacher Program Interviews
Revised June, 1996

Mathematics/Science Course Experience

A. Audience for Course
   1. All students
   2. Majors only (Any science or mathematics major)
   3. Non-majors only
   4. Teacher candidates only
   5. Other

B. Course Objectives
   1. Content knowledge
      a. Factual
      b. Conceptual understanding, e.g., chooses and emphasizes certain principles or concepts
      c. Application
      d. Other
   2. Skills
      a. Laboratory/experimental procedures
      b. Algorithmic, e.g., using formulas
      c. Problem-solving/critical thinking
      d. Other
   3. Nature of science
   4. STS
   5. Interest/prepare students
      a. To select a mathematics/science major or upper level courses
      b. For graduate school, professional schools, and research careers
      c. Other
   6. Enjoyment of science
   7. Other

C. Course Instruction
   1. Lecture
   2. Demonstration
   3. Labs
      a. Procedure known, answer known
      b. Procedure known, answer unknown
      c. Procedure unknown, answer known
      d. Procedure unknown, answer unknown
      e. Other
   4. Solving problem sets
   5. Tutorial sessions
   6. Discussion groups
   7. Grouping
      a. Cooperative learning
      b. Lab partners/groups
      c. Study groups
      d. Other

C. Course Instruction, cont.
   8. Overall impressions
      a. Positive
      b. Negative
         i. Repetitive
         ii. Lacking substance
         iii. Lacking coherence/connections
         iv. Lacking relevance
         v. Too general
         vi. Other
   9. Other

D. Instructional Resources
   1. Textbook
   2. A-V
   3. Lab manual
   4. Study guides/course guides
   5. Readings, e.g., collection of articles
   6. Sample exams
   7. Technical instrumentation/equipment
   8. Computer software
   9. Simulation software
   10. CD ROM
   11. Electronic communications, e.g., Internet, WWW
   12. Other

E. Methods of Assessing Student Progress in Mathematics/Science
   1. Objective exams, e.g., multiple-choice, true-false, short answer
   2. Essay exams
   3. Oral exams
   4. Homework
   5. Performance
   6. Presentations
   7. Term papers
   8. Performance in labs
      a. Reports
      b. Quizzes/tests
   9. Other

F. Student Research Experiences in Mathematics/Science
   1. Undergraduate
      a. For faculty (outside of a course)
      b. Within a course
      c. Extension of a course
      d. Independent study
      e. None
      f. Other
   2. Graduate
      a. For faculty (outside of a course)
      b. Within a course
      c. Extension of a course
      d. Independent study
      e. None
      f. Other

G. Important Mathematics/Science Experiences
  1. What was learned
    a. Experiences that built skills
    b. Experiences that were immediately useful
    c. Other
  2. Specific instructional strategies
    a. Experiences directed toward the real-world
    b. Experiences that required analysis
    c. Experiences that were structured and well-organized
    d. Fieldwork in mathematics and science
    e. Experiences that used exploration and discovery
    f. Experiences that taught learners how to think
    g. Hands-on experiences
    h. Group work
    i. Traditional, e.g., lecture
    j. Other
  3. Materials used
  4. Ways of evaluating student learning
  5. Faculty role
    a. Study with enthusiastic faculty
    b. One-on-one experiences with faculty
    c. Working with faculty who were responsive to student needs and preferences
    d. Good teacher
    e. Other
  6. Lab or teaching assistant
  7. Other

H. Student-Faculty Relationships in Mathematics/Science
  1. No relationship in large classes
  2. Faculty accessible for assistance
  3. Graduate students accessible for assistance
  4. Strained, tense
  5. Impersonal
  6. Close, strong, personal, good
  7. Strong, because of faculty priority on teaching
  8. Little, because faculty priority on research rather than teaching
  9. Faculty maintains contact with students after graduation
  10. Other

I. Student Cohorts in Mathematics/Science
  1. Formal
  2 Informal
  3. None
  4. Other

J. Purpose of Mathematics/Science Study
  1. Teacher preparation
  2. Mathematics/science career
  3. Requirements for degree
  4. Other

Teacher Education Course Experiences (includes mathematics/science education)

K. Course Objectives
1. Teacher as researcher
2. Teacher as reflective practitioner
3. Teaching as a profession
   a. By sharing teaching experiences
   b. By discussing content relevant to teaching
   c. Teacher organizations
   d. Professional issues, e.g., education reform, legal issues, standards (professional and content), rules of conduct, ethics, etc.
   e. Other
4. Human development
5. Psychology of teaching and learning
6. Testing, measurement, evaluation and assessment
7. Philosophy of teaching
   a. Develop research-based rationale
   b. Understand various models of teaching
   c. Constructivist philosophy
   d. Other
8. Management of learning environments
   a. Where secondary students are active learners
   b. Classroom management and discipline issues
   c. Other
9. Instructional design, e.g., lesson or unit planning
10. Nature of science/mathematics
11. Instructional technology
12. Managing instructional resources, e.g., making wise purchasing decisions, using different types of resources in the classroom, etc.
13. STS
14. Social foundations of education, e.g., role of schooling in society
15. Develop writing skills
16. Process skills of mathematics/science
17. Other

L. Course Instruction
1. Lecture
2. Group work (referred to as "group work" or any reference other than "cooperative learning")
3. Group work referred to as cooperative learning
4. Cooperative learning
5. Problem solving tasks
6. Discussion
7. Micro-teaching
8. Classroom observation (see letter O. on Field Experiences)
9. Videotape analysis
10. Socratic dialogue
11. Hands-on activities
12. Projects
13. Labs
14. Worksheets
15. Modeling effective instruction

L. Course Instruction, cont.
- 16. Technology-based
- 17. Out-of-class study groups
- 18. Overall impressions
  - a. Positive
  - b. Negative
    - i. Repetitive
    - ii. Lacking substance
    - iii. Lacking coherence/connections
    - iv. Lacking relevance
    - v. Too general
    - vi. Other
- 19. Other

M. Instruction Resources
- 1. Textbook
- 2. A-V
- 3. Lab manual/project or activity resource books
- 4. Study guides/course guides
- 5. Readings, e.g., collection of articles, professional journals, etc.
- 6. Field experiences guides
- 7. Standards and frameworks documents
- 8. Computer software
- 9. Simulation software
- 10. CD ROM
- 11. Electronic communications, e.g., Internet, WWW
- 12. Actual classroom settings, e.g., instruction takes place in classroom in schools
- 13. Other

N. Methods of Assessing TC Progress in Teacher Education
- 1. Objective tests/exams, e.g., multiple-choice, true-false, short answer
- 2. Essay exams
- 3. Oral exams
- 4. Homework
- 5. Performance, e.g., student performs an activity
- 6. Presentations
- 7. Term papers
- 8. Performance in labs
  - a. Reports
  - b. Quizzes/tests
- 9. Teaching
  - a. Actual teaching
  - b. By videotape
  - c. Micro-teaching
  - d. Other
- 10. Projects
- 11. Lessons/unit plans
- 12. Authentic methods
  - a. Journals
  - b. Portfolios
  - c. Peer evaluation
  - d. Self-evaluation
  - e. Interview
  - f. Other
- 13. Other

Alternative Certification Teachers

U. Professional Career Before Teaching
   1. Number of years in career(s) prior to teaching
      a. 1-5
      b. 6-10
      c. 11-15
      d. More than 15
   2. Type of career
      a. Science/mathematics-related
      b. Teaching-related (e.g., teaching on the job)
      c. Unrelated to science/mathematics or teaching
      d. Other

V. Career Contributions to Teaching
   1. Better at discipline because of more life experience
   2. More knowledge of science/mathematics; teacher is expert
   3. Science/mathematics career gives more credibility with students
   4. More familiarity with applications which interest students
   5. More focused on teaching; teaching deliberately-chosen career
   6. None
   7. Other

Salish I Research Project
Preservice Program Interview
Mathematics/Science Faculty Form

1. How would you describe the mathematics/science courses you teach?
   Probe for:
   a. types of objectives, e.g., certain knowledge, specific skills, attitudes toward mathematics/science.
   b. typical instructional strategies, e.g., lecture, labs, projects, seminar discussion, independent research, cooperative learning, etc.
   c. instructional resources, e.g., textbooks, instrumentation, technologies, etc.

2. How do you typically evaluate students in your courses?
   Probe for:
   a. written tests; b. essays; c. projects; d. oral presentations; e. research performance;
   f. homework assignments; and g. evaluation by peers.

3. How often do students work in groups in your courses?

4. Do you teach courses only for students preparing to teach mathematics/science?

5. How often do students work on actual research projects or in actual research facilities as part of your courses?
   Probe for:
   nature and duration of field experiences.

6. What role do you play in managing or evaluating your program?

7. What relationships exist between your department and those responsible for teacher education in general, science education, and mathematics education?
   Probe for:
   a. formal; b. informal; c. as facilitating reform; d. as obstacles to reform; and
   e. internal politics.

8. How satisfied are you with your program and courses? Why?

9. What are the procedures for changing courses or programs in your institution?
   Probe for:
   a. What changes have occurred in the past 5 years?
   b. What changes are in progress;
   c. Why did you make these changes?
   d. What prompts you (personally) to change?

10. How do you advise, support, and assist your students?
    Probe for:
    a. formal; b. informal; c. interpersonal; d. while in the program and
    e. after graduation.

11. Are your students encouraged to join professional organizations (which ones)?

12. What coherence (if any) do you see in your teacher prep program?

Salish I Research Project

Coding Scheme for Mathematics/Science Faculty Interviews and Course Syllabi

Revised May, 1996

A. Audience for Course

1. All students
2. Majors only
3. Non-majors only
4. Teacher candidates only
5. Other

B. Course Objectives

1. Content knowledge
   a. Factual
   b. Conceptual understanding, e.g., chooses and emphasizes certain principles or concepts
   c. Application
   d. Other
2. Skills
   a. Laboratory/experimental procedures
   b. Algorithmic, e.g., using formulas
   c. Problem-solving/critical thinking
   d. Other
3. Nature of science
4. STS
5. Interest/prepare students
   a. To select a mathematics/science major or upper level courses
   b. For graduate school, professional schools, and research careers
   c. Other
6. Enjoyment of science
7. Other

C. Course Instruction

1. Lecture
2. Demonstration
3. Labs
   a. Procedure known, answer known
   b. Procedure known, answer unknown
   c. Procedure unknown, answer known
   d. Procedure unknown, answer unknown
   e. Other
4. Solving problem sets
5. Tutorial sessions
6. Discussion groups
7. Grouping
   a. Cooperative learning
   b. Lab partners/groups
   c. Study groups
   d. Other
8. Other

D. Instructional Resources

1. Textbook
2. A-V
3. Lab manual
4. Study guides/course guides
5. Readings, e.g., collection of articles
6. Sample exams
7. Technical instrumentation/equipment
8. Computer software
9. Simulation software
10. CD ROM
11. Electronic communications, e.g., Internet, WWW
12. Other

E. Methods of Assessing Student Progress

1. Objective exams, e.g., multiple-choice, true-false, short answer
2. Essay exams
3. Oral exams
4. Homework
5. Performance
6. Presentations
7. Term Papers
8. Performance in labs
    a. Reports
    b. Quizzes/tests
9. Other

F. Research Experiences

1. For faculty (outside of course)
2. Within a course
3. Extension of a course
4. Independent study
5. None
6. Other

G. Faculty's Responsibility for Course/Program Management/Evaluation

1. Alone
    a. Course taught only
    b. None
    c. Courses throughout the department
    d. Other
2. Part of a group of faculty
    a. Course(s) they teach
    b. None
    c. Courses throughout the department
    d. Other
3. Department (e.g., committee, etc.) responsible
4. College responsible
5. Other

H. Procedures for Changing Courses/Programs

1. None
2. Up to individual faculty or group of faculty teaching a particular course
3. Departmental procedures
4. College-wide procedures
5. University-wide procedures
6. Other

I. Relationships with Teacher Education

1. None
2. Informal, e.g., through personal contacts and experiences
3. Informally encouraged by the department
4. Formal
5. Other

J. Student Advising and Support/Involvement

1. None
2. Mathematics/science majors only
3. Group of students assigned, includes majors and non-majors
4. Involved with students after their graduation
5. Other

K. Professional Linkages

1. Required
2. Encouraged
3. Through alumnae groups
4. Non addressed or encouraged
5. Other

L. Perception of Program Coherence ("Program" includes content, teacher education, and mathematics/science education)

1. Strong and formalized
2. Weak and informal
3. Non-existent, no attempt
4. Other

M. Faculty's Personal Philosophy of Mathematics/Science

1. Body of knowledge
2. Process
3. Changing based on experience and research
4. Other

N. Philosophy of Teaching Stressed in the Course

1. Constructivism (single word, short response)
2. Has no single philosophy
3. Teachers should meet student needs as the students perceive their needs
4. Teachers should assess prior student knowledge and work accordingly
5. Teaching should be interactive
6. Teaching should follow the Socratic approach to learning
7. A teacher has to facilitate the learning of students
8. Students should have experiences appropriate for them to construct their own knowledge
9. Students should engage in solving problems
10. Less is more
11. The job of the teacher is to implement a curriculum
12. Total Quality Management - customer satisfaction
13. Teaching as analytical decision making
14. Focus on using knowledge rather than accumulating it
15. Teachers should empower students as learners
16. Value diversity of students
17. Stimulate thinking on the nature of science
18. Test for understanding as opposed to memorization
19. Students should have direct personal experience
20. Handle student diversity as "teaching to the middle"
21. Job of teacher is to transmit content knowledge and/or skills
22. Teaching and learning should focus on impact on the student's own world, or personal relevance
23. Other

Salish I Research Project
Preservice Program Interview
Teacher Education Faculty Form

1. How would you describe the teacher education courses you teach?
   Probe for:
   a. types of objectives, e.g., certain knowledge, specific skills, attitudes toward mathematics/science or teaching secondary school students.
   b. typical instructional strategies, e.g., lecture, labs, projects, seminar discussions, independent research, cooperative learning, etc.
   c. instructional resources, e.g., textbooks, instrumentation, technologies, etc.

2. How do you typically evaluate students in your courses?
   Probe for:
   a. written tests; b. essays; c. projects; d. oral presentations; e. research performance;
   f. homework assignments; and g. evaluation by peers.

3. How often do you use cooperative learning techniques in your courses?

4. Do you teach courses only for students preparing to teach mathematics/science?

5. How often do students work in schools and classrooms as part of your courses?
   Probe for: nature and duration of field experiences.

6. What philosophy of (a) mathematics/science, and (b) teaching do you stress in your courses?

7. What role do you play in managing or evaluating your program?

8. What relationships exist between your department and those responsible for [mathematics, science, teacher education in general, science education, mathematics education]?
   Probe for:
   a. formal; b. informal; c. as facilitating reform; d. as obstacles to reform; and
   e. internal politics.

9. How satisfied are you with your program and courses? Why?

10. What are the procedures for changing courses or programs in your institution?
    Probe for:
    a. What changes have occurred in the past 5 years?
    b. What changes are in progress?
    c. Why did you make these changes?
    d. What prompts you (personally) to change?

11. How do you advise, support, and assist your students?
    Probe for:
    a. formal; b. informal; c. interpersonal; d. while in the program; and e. after graduation.

11\. Are your students encouraged to join professional organizations (which ones)?

12\. What coherence (if any) do you see in your teacher prep program?

Salish I Research Project

Coding Scheme for Teacher Education Faculty Interviews and Course Syllabi

Revised May, 1996

A. Audience for Course(s)

1. Mathematics education only
2. Science education only
3. All secondary education, e.g., middle, junior and senior high school
4. All elementary and secondary education
5. Level
   a. Undergraduate only
   b. Graduate only
   c. Both undergraduate and graduate
   d. Other
6. Other

B. Course Objectives

1. Teacher as researcher
2. Teacher as reflective practitioner
3. Teaching as a profession
   a. By sharing teaching experiences
   b. By discussing content relevant to teaching
   c. Teacher organizations
   d. Professional issues, e.g., education reform, legal issues, standards (professional and content), rules of conduct, ethics, etc.
   e. Other
4. Human development
5. Psychology of teaching and learning
6. Testing, measurement, evaluation and assessment
7. Philosophy of teaching
   a. Develop research-based rationale
   b. Understand various models of teaching
   c. Constructivist philosophy
   d. Other
8. Management of learning environments
   a. Where secondary students are active learners
   b. Classroom management and discipline issues
   c. Other
9. Instructional design, e.g., lesson or unit planning
10. Nature of science/mathematics
11. Instructional technology
12. Managing instructional resources, e.g., making wise purchasing decisions, using
    different types of resources in the classroom, etc.
13. STS
14. Social foundations of education, e.g., role of schooling in society
15. Develop writing skills
16. Process skills of mathematics/science
17. Other

C. Course Instruction

1. Lecture
2. Group work (referred to as "group work" or any reference other than "cooperative learning")
3. Group work referred to as cooperative learning
4. Cooperative learning
5. Problem solving tasks
6. Discussion
7. Micro-teaching
8. Classroom observation (see letter F. on Field Experiences)
9. Videotape analysis
10. Socratic dialogue
11. Hands-on activities
12. Projects
13. Labs
14. Worksheets
15. Modeling effective instruction
16. Technology-based
17. Out-of-class study groups
18. Other

D. Instructional Resources

1. Textbook
2. A-V
3. Lab manual/project or activity resource books
4. Study guides/course guides
5. Readings, e.g., collection of articles, professional journals, etc.
6. Field experiences guides
7. Standards and frameworks documents
8. Computer software
9. Simulation software
10. CD ROM
11. Electronic communications, e.g., Internet, WWW
12. Actual classroom settings, e.g., instruction takes place in classrooms in schools
13. Other

E. Methods of Assessing Student Progress

1. Objective tests/exams, e.g., multiple-choice, true-false, short answer
2. Essay exams
3. Oral exams
4. Homework
5. Performance, e.g., student performs an activity
6. Presentations
7. Term papers
8. Performance in labs
    a. Reports
    b. Quizzes/tests

E. Methods of Assessing Student Progress, cont.

9. Teaching
   a. Actual teaching
   b. By videotape
   c. Micro-teaching
   d. Other
10. Projects
11. Lessons/unit plans
12. Authentic methods
   a. Journals
   b. Portfolios
   c. Peer evaluation
   d. Self-evaluation
   e. Interview
   f. Other
13. Other

F. Field Experiences as a Part of Course(s)

1. Number of required clock hours of classroom-based field experiences for this course
   a. 0
   b. 1-20
   c. 21-50
   d. 51-100
   e. 100 plus
2. Number of required clock hours of non-classroom-based field experiences for this course
   a. 0
   b. 1-20
   c. 21-50
   d. 51-100
   e. 100 plus
3. Activities
   a. Teaching
   b. Observing
   c. Tutoring or working with one or a few students
   d. Administering tests
   e. Planning lessons
   f. Grading student papers
   g. Administrative tasks, e.g., tracking attendance, etc.
   h. Action research
   i. Other

G. Faculty's Responsibility for Course/Program Management/Evaluation

1. Alone
   a. Course taught only
   b. None
   c. Courses throughout the department
   d. Other
2. Part of a group of faculty
   a. Course(s) they teach
   b. None
   c. Courses throughout the department
   d. Other
3. Department (e.g., committee, etc.) responsible
4. College responsible
5. Other

H. Procedures for Changing Courses/Programs

1. None
2. Up to individual faculty or group of faculty teaching a particular course
3. Departmental procedures
4. College-wide procedures
5. University-wide procedures
6. Other

I. Relationships with Mathematics/Sciences Departments

1. None
2. Informal, e.g., through personal contacts and experiences
3. Informally encouraged by the department
4. Formal
5. Other

J. Student Advising and Support-Involvement in

1. None
2. Mathematics/science majors only
3. Group of students assigned, includes mathematics/science majors and non-majors, or only some preparing to teach secondary school mathematics/science along with others
4. Group of students preparing to teach secondary school mathematics/science only
5. Involved with students after their graduation
6. Other

K. Professional Linkages

1. Required
2. Encouraged
3. Through alumnae groups
4. Not addressed or encouraged
5. Other

L. Perception of Program Coherence ("Program" includes content, teacher education, and mathematics/science education)

1. Strong and formalized
2. Weak and informal
3. Non-existent, no attempt
4. Other

M. Faculty's Personal Philosophy of Mathematics/Science

1. Body of knowledge
2. Process
3. Changing based on experience and research
4. Other

N. Philosophy of Teaching Stressed in the Course

1. Has no single philosophy; no philosophy expressed
2. Constructivism
   a. Not explained; word just referenced
   b. Teachers should meet student needs as the students perceive their needs
   c. Teachers should assess prior student knowledge and work accordingly
   d. Teachers should facilitate the learning of students
   e. Secondary school students should have experiences appropriate for them to construct their own knowledge
   f. Teachers should empower students as learners
   g. Teachers should be reflective practitioners
   h. Others
3. Teaching should be interactive
4. Teaching should follow the Socratic approach to learning
5. Students should engage in solving problems
6. Less is more
7. The job of the teacher is to implement a curriculum
8. Total Quality Management - customer satisfaction
9. Teaching as analytical decision making
10. Focus on using knowledge rather than accumulating it
11. Value diversity of students
12. Stimulate thinking on the nature of science
13. Test for understanding as opposed to memorization
14. Handle student diversity as "teaching to the middle"
15. Job of teacher is to transmit content knowledge and/or skills
16. Teaching and learning should focus on impact on the student's own world, or personal relevance
17. Teachers should adopt a research-based, best practices-based approach
18. Teaching is based on practical, situational, reality-oriented analysis of the classroom
19. Teacher is a professional
20. Other

Salish I Research Project
Syllabus Analysis Form

Standard Operation Procedures

The amount and type of information contained in syllabi vary widely. Not all of the categories below will be appropriate for all syllabi. Researchers should fill in only those categories that are applicable, using as much space as needed. Researchers are encouraged to enter this form on computer, adding information for each syllabus, so that the spacing for each category will be dependent on the amount of information available.

The weekly subject analysis should include approximately one week per cell for the length of the course. Although the time will vary, it should take about 45 minutes to enter the information from a syllabus into the analysis form.

Course title:

Department:

Credits (quarter or semester):

Target population:

Course goals and objectives:

Material(s) used (include separate readings):

Assignments:

Class activities/labs (if different from assignments):

Types of assessment used:

Field work experiences:

1/9/95

Major topics addressed, by week:

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	

Week 14	
Week 15	

Salish I Research Project
New Teacher Transcript Summary

Directions: These data are to be obtained, with the NTs' permission, from whatever source is available.

Teacher ID Number: ____________________

TRANSCRIPT

1. Total Number of Credit Hours:
   a. Combined Mathematics/Science ____________________
   b. Teacher Preparation - General ____________________
   c. Teacher Preparation:
      Science Education ____________________
      Mathematics Education ____________________

2. Undergraduate GPA:
   a. Overall ____________________
   b. Combined mathematics/Science ____________________
   c. Teacher Preparation (Combined general and mathematics or science preparation courses) ____________________

3. Graduate GPA:
   a. Overall ____________________
   b. Combined Mathematics/Science ____________________
   c. Teacher Preparation (Combined general and mathematics or science preparation courses) ____________________

4. Examinations (Post-Baccalaureate):
   a. GRE ____________
   b. NTE ____________
   c. Other:
      Test ____________________ Score ____________________

Salish I Research Project

Coding Scheme for Program Descriptions
November, 1995

A. Admission to the Teacher Education Program

1. Undergraduate degree required for admission
    - a. Yes
        - i. Any degree or
        - ii. Mathematics/science
        - iii. Other
    - b. No
2. Minimum number of college semester hours required for admission (each quarter hour equals 2/3 semester hours)
    - a. 0
    - b. $\leq$ 15
    - c. 16 to 30
    - d. 31 to 60
    - e. $>$ 60
3. Minimum GPA required for admission
    - a. None
    - b. 2.0 to 2.25
    - c. 2.26 to 2.5
    - d. $>$ 2.5
4. Minimum test scores required for admission
    - a. National standardized tests
        - i. General literacy
        - ii. Subject matter
        - iii. Other
    - b. State standardized tests
    - c. Non-standardized tests
    - d. None required
    - e. Other
5. Completion of specific courses (prior to admission to the program)
    - a. Yes
        - i. Minimum grade required
        - ii. No minimum grade required
    - b. No
6. Employment contract with school district required for admission to the program
    - a. Yes
    - b. No
7. Letters of Recommendation required for admission to the program
    - a. Yes
    - b. No
8. Self assessment tests or batteries required for admission to the program
    - a. Yes
    - b. No
9. Interview required for admission to the program
    - a. Yes
    - b. No
10. Writing sample required for admission to the program
    - a. Yes
    - b. No
11. Other

B. Types of Certification Awarded
1. By grade level
   a. Elementary   c. Middle school (5-9)
   b. Secondary (5-12)   d. Senior high (9-12)
2. By subject matter
   a. Single field
   b. Dual field
   c. All fields
3. By grade level and subject matter

C. Number of Certifications Per Year
1. Secondary science
   a. 0   b. 1-10   c. 11-20   d. Over 20
2. Secondary mathematics
   a. 0   b. 1-10   c. 11-20   d. Over 20

D. Semester Hour Requirements (Each quarter hour equals 2/3 semester hour)
1. Mathematics for mathematics majors
   a. 0-20   b. 21-40   c. 41-60   d. Over 60
2. Science for science majors
   a. 0-20   b. 21-40   c. 41-60   d. Over 60

NOTE: FOR CATEGORIES 3-12 BELOW, USE THE FOLLOWING SEMESTER HOUR CODES:
   a. 0-4   b. 5-8   c. 9-16
   d. 17-24   e. More than 24

3. Mathematics for science majors
4. Science for mathematics majors
5. Mathematics/science methods
6. General methods
7. History and philosophy of science
8. STS course work
9. Psychology foundations
10. Social foundations
11. Multicultural education (diversity)
12. Computers and related communications technology

E. Field Experiences
1. Number of clock hours of classroom-based field experiences, before student teaching/internship
   a. 1-20   c. 51-100   e. None
   b. 21-50   d. 100 plus
2. Number of clock hours of non-classroom based field experience, before student teaching/internship
   a. 1-20   c. 51-100   e. None
   b. 21-50   d. 100 plus
3. Number of weeks of student teaching/internship
   a. 1-6   c. 13-18   e. Over 24
   b. 7-12   d. 19-24
4. Student teaching/internship
   a. Full-time
   b. Part-time
   c. Mixture of full and part-time

E. Field Experiences, cont.

5. Nature/scope and sequence of field experiences (not including student teaching)
    a. Supervised
        i. Yes
        ii. No
    b. Part of
        i. Seminar
        ii. Separate course
        iii. Incorporated into existing course(s)
    c. Related to pedagogy of teacher preparation program
    d. Experiences in different levels, schools, grades
    e. Sites selection
        i. By student
        ii. By university
    f. Other
6. Nature of student teaching experiences
    a. Supervision by
        i. Mathematics/science content specialist
        ii. Mathematics/science educator
        iii. General teacher educator
    b. Part of
        i. Seminar
        ii. Separate course
        iii. Incorporated into existing course(s)
    c. Related to pedagogy of teacher preparation program
    d. Experiences in different levels, schools, grades
    e. Sites selection
        i. By student
        ii. By university
    f. Screening of cooperating teachers
        i. Usually
        ii. Sometimes
        iii. Rarely
    g. Other
7. Activities in the field experience
    a. Teaching
    b. Observing
    c. Tutoring
    d. Administering tests
    e. Planning lessons
    f. Grading student papers
    g. Tracking attendance
    h. Other

F. Structure

1. Faculty joint appointments between mathematics/science and teacher education
    a. Yes
    b. No
2. Mathematics/science teacher education program is part of:
    a. Mathematics/science department(s)/colleges
    b. Education department/college
    c. Both education and mathematics/science departments/colleges

F. Structure, cont.

3. Student teacher placement decided by
    a. School/college of education
    b. Department of mathematics/science
    c. School districts
        i. Supervisors/administrators
        ii. Teachers
    d. Joint decision by university, school district, etc.
4. Teacher candidates (TCs) proceed through the program in cohorts
    a. For learning mathematics/science content
        i. Formal
        ii. Informal
        iii. No
        iv. Other
    b. For general teacher education experiences
        i. Formal
        ii. Informal
        iii. No
        iv. Other
    c. In mathematics/science education
        i. Formal
        ii. Informal
        iii. No
        iv. Other
5. Involvement of Practicing Teachers in Program
    a. Not at all
    b. In program planning
    c. In program implementation
    d. Other

G. Evaluation

1. Internal
    a. By mathematics/science education component
    b. By teacher education component
    c. By mathematics/science department
    d. None
    e. Other
2. External
    a. State agency/department
    b. NCATE
    c. Regional (e.g., North Central Accreditation Association)
    d. Cooperating teachers
    e. Other
3. Data sources for evaluation
    a. TCs
    b. Graduates
    c. Faculty
    d. Cooperating teachers
    e. School/district administrators
    f. Other

H. Advisement - student is advised by

1. Teacher education faculty
2. Mathematics/science faculty
3. Both
4. Other

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