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FACTORS INFLUENCING THE EFFECTIVENESS
OF MICROTEACHING IN A
TEACHER EDUCATION PROGRAMME

VOLUME 2 APPENDICES

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APPENDIX A

NOTES TO STUDENTS, STIRLING PROGRAMME

SPRING SEMESTER 1972

AUTUMN SEMESTER 1972

(QUESTIONING FOR FEEDBACK)

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONEDUCATION 13 - SPRING SEMESTER 1972- AUTUMN SEMESTER 1972QUESTIONING FOR FEEDBACK1. Untested Assumptions about Pupils

In planning a lesson, one has to make assumptions about

- (i) those initial interests, attitudes, knowledge and skills of pupils which one intends to make use of in the lesson
- (ii) the effects which each phase of one's lesson will have upon pupils

In implementing one's plans for a lesson it is wise, before proceeding with each phase, to check that the major assumptions upon which it is based are valid.

In order to do this effectively, it is essential to make as many as possible of these assumptions explicit to oneself beforehand.

When observing lessons, enter a tally whenever one of these predetermined assumptions is acted upon without any questions being asked to test its validity.

2. Types of Question

- (a) There are several types of information about pupils which can be relevant to one's decisions in teaching, and it is important that one's questions should not all be aimed at obtaining the same type of information. Four categories of questions are suggested:

Questions to test knowledge (recall) of information

Questions to test comprehension i.e. to ensure that pupils have understood concepts or relationships. Unless carefully chosen, questions intended to test comprehension may only be assessing recall of previously learned information. Among the most useful ways of testing comprehension are questions seeking new examples of a learned generalization or seeking new applications of a learned rule.

Questions to assess interests or attitudes. Since pupils tend to express attitudes of which they think the teacher will approve, it is often most useful to ask indirect questions for this purpose, for example about how pupils spend their leisure time, or about facts which they are only likely to know if they take an interest in the subject. (Non verbal feedback can, however, be more reliable in this area, if the teacher is sensitive to it).

Questions to encourage pupils to contribute their own experience and ideas. In addition to asking questions to ensure that pupils are following the teacher's arguments, it can be particularly valuable to ask 'open' questions which invite pupils to answer at some length and thus to reveal the way they think about the subject under discussion. Apart from showing misconceptions or differences in perspective from the teacher, this can also indicate ways of approaching the subject which are most likely to interest pupils.

(b) Pupil Responses

It is easy to obtain unrepresentative feedback from a vocal minority of pupils. A deliberate effort is therefore necessary to obtain feedback from all pupils, for example by addressing some questions to individuals as well as some to the group as a whole.

Especially where there is more than one 'correct' answer to a question, it can be valuable to elicit answers to it from more than one pupil.

When observing lessons, allocate each question to that one of the four categories to which it appears closest, and enter in that row a tally for each pupil who responds, or, if there are no responses, in the column marked 'none'.

3. Inadequate Questions

There are several ways in which questions can fail to be useful for obtaining reliable feedback.

Two of the most common are:

Lack of Definition. Where it is not clear to the pupils what sort of answer the teacher wants. When a teacher reacts to an answer by saying something like 'That is not the sort of thing I was looking for', one should ask whether he had communicated to pupils what he did want.

Leading Questions. Particularly common among questions relating to attitudes; but, more generally, if pupils can tell the 'correct' answer from the way in which a question is asked, no useful feedback is likely to be obtained.

At first sight, it may seem that adequate definition of a question is likely to make it a leading question, but this is not the case. What one should aim at is to communicate clearly to pupils the criteria one wants them to use in answering, but to avoid giving unintentional clues to the answer.

4. Lack of Attention to Pupil Response

Good questions are of little value unless the teacher listens to the pupils' answers; but it is easy to be so busy deciding what one is going to do next that one does not give one's full attention to the answer.

One obvious indication that a teacher is not really listening to what a pupil is saying is for the teacher to interrupt the pupil in mid-sentence with some further question or statement, or to start talking when the pupil has paused but appears to be about to say something further.

Beyond this, a pupil's answer is not being used as 'feedback' unless it influences the teacher's subsequent behaviour (by modifying, 'filling out', or confirming the teacher's 'plan'). When a teacher has listened to a pupil's answer, the way in which this answer influences his subsequent behaviour will often be apparent. The teacher may, for example, follow up the answer by asking the pupil to elaborate upon it; he may compare the answer with that given by other pupils or ask other pupils whether they agree with it; he may add to the information given by the pupil, base an argument on the pupil's answer, or use it as a basis for a new question. And even when the teacher's intentions are in no way changed by a pupil's answer, it is encouraging to the pupil for the teacher at least to make it clear that he has taken note of the answer.

When observing lessons, enter a tally whenever the teacher does not appear to be listening to a pupil response, or whenever his subsequent behaviour suggests that he has not taken account of it.

QUESTIONING FOR FEEDBACK

1.

Untested assumptions about pupils	
-----------------------------------	--

2.

	PUPIL RESPONSES					
	A	B	C	D	E	None
Information						
Comprehension						
Interests/Attitudes						
Pupil Contribution						

3. INADEQUATE QUESTIONS

Lack of Definition	
Leading Questions	

4.

Lack of Attention to Pupil Response	
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UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONQUESTIONING FOR FEEDBACKCODING PROCEDURE1. Untested Assumptions about PupilsA. Affective Code all instances of the following:

- (i) Teacher expresses an attitude towards a specific object under discussion in such a way that observer infers that teacher assumes that this attitude is shared by pupils, although there is no evidence to support this assumption.

e.g. 'Of course none of us believe in such superstitious nonsense.'

'Water pollution is causing the extinction of much of the natural life of rivers. So naturally we have to think of ways of preventing it.'

- (ii) Teacher introduces an example or background material which the observer interprets as being sufficiently distinctive (and not particularly appropriate from a cognitive viewpoint) as to have been introduced largely on the assumption that it will be particularly interesting to pupils, with this assumption not being tested.

e.g. Using fireworks (via Guy Fawkes) as an introduction to the subject of revolution.

Using a pop-song as an introduction to some aspect of poetry not particularly well exemplified in the song.

B. Cognitive Code all instances of the following:

- (i) Giving an explanation or description which can only be understood if pupils already know identifiable facts or understand identifiable concepts or relationships which either have not been presented or explained during the lesson and which pupils of this age are unlikely (in the judgement of the observer) to know or understand or have been presented during the lesson without the teacher testing pupil understanding of his explanation of them.

- (ii) Use of vocabulary which is distinctively abstract or technical in comparison with that used in the remainder of teacher-pupil conversation.

2. Types of Questions

All questions which are not rhetorical or procedural (e.g. 'Can you all see?', 'What time is it?') should be coded in this section. A question is defined as any verbal solicitation from the teacher for a pupil to respond which is either accompanied by an indication of which pupil should answer or followed by a silence of at least two seconds on the part of the teacher.

If a question is followed (after more than two seconds silence) by a further question or exposition from the teacher, 'No response' should be coded. Otherwise each response from a different pupil to the question should be coded. More than one response to the same question from one pupil should not be coded - the 'same' question being defined as any question to which the same range of answers are, in the opinion of the observer, appropriate.

- A. Recall of learned information: Questions which explicitly ask the pupil to demonstrate his knowledge of a particular fact or concept which the teacher believes to have been previously learned.
- B. Recall of personal experience: Questions which explicitly ask the pupil to recount a specific aspect of his previous experience: other than personal reactions to experience:
 e.g. Where did you go for your holidays last year?
 Have you ever been rock-climbing?
- C. Comprehension/Application: Questions which ask the pupil to demonstrate his ability to use his knowledge of the particular area by explaining in his own words, providing further examples, applying a learned concept to a new situation, or perceiving new relationships as a result of what he has learned.
- D. Level of Interest: Questions designed to ascertain the extent to which the pupil(s) are interested in a specified topic within the lesson. Either by (1) Direct Questioning:
 e.g. Do you enjoy reading poetry? or (2) Questions about personal reactions to experience: e.g. When listening to pop songs do you listen to the words or to the music.
- E. Attitudes towards objects: Questions designed to determine the complex attitudes of individual pupils towards specific objects under discussion in the lesson, either by (1) direct question:
 e.g. Do you like painting? or (2) Questions which allow the teacher to assess pupil attitudes: e.g. Would you like to do a painting? (A. I don't like drawing) or How would you react if you saw a crowd of boys beating up a smaller boy? What would you do if . . . ?

F. Pupil Contribution: Questions which invite the pupil to answer at some length from the background of his personal experience or ideas, such that the pupil himself must perceive the relationship of these ideas or experiences to the themes of the lesson, without having it pointed out to him by the teacher:

- e.g. (i) What do you think if when I first say the word teeth?
 (ii) After showing a number of chemical phenomena. 'Do you see any pattern in all this?'
 (iii) What does this poem make you think of?

This category should be distinguished from that concerning attitudes by the specifications that: can object towards which attitudes were to be expressed would be specifically named and an evaluation or a choice would be directly asked for. If either of these is not asked for the question comes into this more open category.

3. Inadequate Questions

A. Lack of Definition: Questions which are so formulated that pupils may be uncertain or misled about the sort of answer which would be appropriate. (Such questions are to be distinguished from genuinely open questions in which the teacher deliberately indicates that answers within a wide and unpredictable range may be appropriate.) A question should be coded within this category if there is an indication, either in the question itself or in the teacher's reaction to an answer, that the teacher has a relatively clear expectation as to the appropriate sort of answer and yet does not make this expectation explicit in his question.

- e.g. 'What is the relation between these things?' (where the things are not clear from the context)
 'Give me an example' (where it is not clear what is to be exemplified)
 (T: 'Where do we get oil from?')
 (P: 'Under the ground')
 (T: 'No, I mean what part of the world.')

B. Leading Questions (Cognitive): Questions of 'recall of learned information' or of 'comprehension/application', in which the teacher gives an unintentional clue to the correct answer. The observer needs to judge whether a deliberate prompt has been given or an unintended clue. An important criterion in making this distinction is whether the teacher has obtained valid information on the point about which he appears to be interested,

- e.g. 'Where was Napoleon imprisoned after Waterloo? No, first of all, who won at Waterloo?'
 'What do Americans call the man who presides over their government?'
 'From what we've said about the climate and geography of Wyoming - which incidentally often comes into cowboy stories - what could one deduce about the most suitable use to which the land could be put there?'

- C. Leading Questions (Affective)? Questions of the 'level of interest' or 'attitudes towards objects' types which the teacher asks in such a way as to indicate the type of attitude he follows.

e.g. 'It's nice to lie on a sunny beach, isn't it?'
'Would you not like to go to University?'

(But tone of voice is probably a more important cue than grammatical form for this category.)

4. Lack of Attention to Pupil Response

Code all instances where:

- (i) No response to a question is followed by neither a rephrasing of the question nor a 'substitute-answer' from the teacher
- (ii) An inappropriate response is made and the teacher fails to make clear why the response is inappropriate.
e.g. 'No, that's not a good example. A better one would be . . .'
- (iii) An apparently appropriate response is made and the teacher proceeds with the lesson in a way that is inconsistent with this response or does not take account of the response either by using it or by reinforcing it.
- (iv) Three consecutive responses are made by the same pupil without any intermediate attempt by the teacher to obtain responses from other pupils. (Code each separate set of three consecutive responses.)

APPENDIX B

NOTES TO STUDENTS, STIRLING PROGRAMME

SPRING SEMESTER 1972

PROBING and HIGHER ORDER QUESTIONING

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONEDUCATION 13 - SPRING SEMESTER 1972PROBING AND HIGHER ORDER QUESTIONING

Questioning, as a technique of teaching involves setting controlled learning tasks for pupils. Exposition by the teacher presents information to which pupils may react in various ways, some attempting to memorise the information, others attempting to comprehend the relationships the teacher is explaining, and a few perhaps attempting to solve the problems implicit or explicit in the lecture (and thus to practise skills of analysing, synthesizing or evaluating information). Questioning, on the other hand, gives the teacher much more control over the tasks the pupils are set.

On the one hand, the teacher can ask for remembered information, for opinions, for application or exemplification of ideas, for interpretation of communications, for explanations, or whatever particular type of thinking he wants pupils to engage in. In this, the teacher should apply two main criteria to his questioning. Firstly, are the tasks which he is trying to set by his questions consistent with the educational objectives he is seeking. For example, if he wants pupils to acquire the skill of analysing information, is he setting tasks which involve this skill, or is he perhaps asking for memorised information? Secondly, is he making clear to pupils what sort of answer he wants? For example, when he asks about the meaning of a word in a poem, is he asking for a definition of the word, as it might be given in a dictionary, or is he asking for an interpretation of the poet's use of the word. The teacher then needs both to be clear about the task he intends to set pupils, and also to communicate effectively the nature of this task to pupils.

Observation of teaching has generally suggested that most questions which most teachers ask are setting tasks emphasising the recall of information. Since nearly all teachers would agree that memorisation of facts is not their main teaching objective, it seems necessary to make a deliberate effort to practise asking questions of a 'higher order'.

Higher Order Questioning

Three categories of questions are defined, roughly based on the distinctions made in Bloom's Taxonomy of Objectives. These are:

- (1) Lower Order Questions: Questions which appear to be asking for recalled information or ideas, simple descriptions or unsubstantiated opinions.

e.g. 'What is Newton's Third Law of Motion?'
 'What can you see out of the window?'
 'Did you like that film?'

(2) Application Questions (corresponding to Bloom's categories of Comprehension and Application): Questions which appear to be asking pupils to demonstrate their understanding of concepts, rules or relationships, usually by dealing with specific examples. Such questions demand that new information be organized in terms of concepts which the teacher assumes, or hopes, pupils have already acquired.

e.g. 'What problems similar to this have we met before?'
 'What does this sentence mean?'
 'How would you solve this equation (one similar to others solved earlier)?'

(3) Synthesis Questions (corresponding to Bloom's categories of Analysis and Synthesis): Questions which appear to be asking pupils to make distinctions, specify relationships or generally formulate new concepts not explicitly formulated before.

e.g. 'In what important ways do these newspapers differ?'
 'Can you, then, say what characteristics mammals share which differentiate them from other organisms?'
 'Can you summarize what the writer is trying to say in this poem?'
 'What is common to all these problems?'

Although the above examples give some indication, it is hoped, of the three categories, it is only in the context of a lesson that it is possible to judge adequately whether a question is lower order, one of application, or one of synthesis. Questions should be classified in relation to their context; and they should be classified according to the teacher's apparent intention, and not according to the apparent nature of pupils' subsequent answers.

Probing

Questioning gives the teacher control over pupils' learning tasks in a second important way: having asked a question, he can modify or extend the task very quickly in the light of pupils' responses. If the task has proved too difficult, it can be broken down into simpler tasks; if the pupil's response is not clear, he can be asked to elaborate upon it, justification can be sought for unsubstantiated opinions.

Probing questions are questions asked of individuals as a follow-up to these individuals' replies to initial questions. Probes seek for clarification, elaboration or justification of the first answer given or attempt to prompt the pupil (give cues or make the question more structured) to enable him to give a more adequate response.

Recording Instrument

The major purpose of this instrument is to direct attention to aspects of questioning behaviour upon which one should concentrate in practising this skill, and assessing one's performance in it. As a recording instrument used by trained observers it can be used to give a fairly accurate record of these aspects of a teacher's behaviour; it may be useful in this way for students, even though, without thorough training, a high level of objectivity cannot be expected. Students working in groups are likely to find it informative to use the instrument, to compose their records of a lesson, and to discuss the reasons for their differences. Use of the instrument for recording the relevant aspects of behaviour is, however, as usual in this course, entirely optional.

In this instrument, all teacher questions are recorded in sequence. Questions are categorized first in terms of the following symbols:

- q: all questions other than those defined below
- c: probing questions (i.e. follow-up questions to the same pupil) seeking clarification or elaboration of the pupil's initial answer
- j: probing questions seeking justification of the pupil's initial answer
- p: prompts to pupil after initial response, or reformulated questions to the same pupil making the question easier
- qx, cx, etc.: questions which are not answered

The record of part of a lesson might look as follows:

Synthesis										q	j		j	
Application					q	cx	c	q	q					q
Lower Order	q	q	qx	p								q		

This means: three lower order questions, the last of which was only answered after a prompt; then a question of application, followed by probing for clarification, initially unsuccessful but achieved after further probing; two further questions of application, followed by one of synthesis, then probing for justification of the answer; then one lower-order question, one probe for justification of the answer, and a question of application.

APPENDIX C

NOTES TO STUDENTS, STIRLING PROGRAMME

AUTUMN SEMESTER 1972

PROBING and HIGHER ORDER QUESTIONING

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONEDUCATION 13 - AUTUMN SEMESTER, 1972PROBING AND HIGHER ORDER QUESTIONING

One reason for teaching by questioning, as opposed to teaching by exposition, is that it gives pupils something to do, allows them to participate in the lesson. But furthermore, a question indicates to pupils what they are expected to do: it sets a task for them. By asking a question, a teacher is attempting to exercise control over, or to direct, pupils' mental activity. In so far as he fails to exercise such control or to give such direction, his question is useless. In so far as he succeeds, he is responsible for the sort of mental activity in which pupils engage. The educational value of pupils efforts to formulate answers depends on the quality of the teacher's questions.

What pupils learn depends largely on the tasks they undertake, and the tasks undertaken depend on the questions asked by teachers. Thus for example, it has clearly been demonstrated that people tend to remember words or statements or poems or nonsense syllables better if they are regularly asked to repeat them. Much traditional teaching has depended on this principle, and many teachers still deliberately apply it when they want pupils to remember particularly important facts, definitions or rules.

If one wants pupils to remember the definition of a preposition, for example, it is useful to ask 'What is a preposition?' on repeated occasions. If, however, one wants pupils to comprehend the concept of 'a preposition' or if one wants them to be able to use prepositions effectively, there is no reason to believe that asking 'What is a preposition?' will help: instead one would need to set pupils tasks (i.e. to ask them questions) planned to help them to achieve these goals.

Whatever goals one is seeking to achieve in teaching, one needs to plan to achieve them. Eventually one's plans as a teacher tend to become habitual, but unless these habits are deliberately acquired in the first place, they will not necessarily be directed towards the achievement of one's conscious professional goals. There is no better example of this generalization than in the contrast between the ambitious aims which most teachers claim to be seeking through their questioning of pupils and the high proportion of 'memory' questions which most teachers ask (apparently without being conscious that these are memory questions). Observation of teachers has consistently shown that on average there is a low frequency of questions which are likely to help pupils to do anything more than memorise. It thus appears to be necessary for most teachers to consciously practise asking questions calculated to help pupils to attain other goals as well.

Types of Questions

Observers of teaching have used many different ways of classifying teachers' questions. Any one system of classification emphasises certain characteristics and ignores others.

The simple classificatory system suggested here categorises teachers' questions in terms of the kinds of tasks which they set and the kinds of objectives towards which these tasks appear to be directed:

- (i) Lower Order Questions set tasks which do not require pupils to modify, develop or use their existing knowledge or ideas, but merely to recount them. Such tasks include recalling or recognizing previously acquired knowledge, recounting personal experiences, expressing unsubstantiated opinions and giving simple descriptions. In so far as they have any direct cognitive objectives (as opposed to providing feedback for the teacher or establishing a basis for other types of question), these questions appear to be directed towards confirming and strengthening pupils' existing knowledge or beliefs.

Examples: 'What is a metaphor?'
 'How do we digest food?'
 'What is Newton's Third Law of Motion?'
 'Recite the poem'
 'What did you do at the seaside?'
 'Describe the crystals which have formed?'
 'Did you like that film?'
 'Do you think it's a good idea for people of different races to marry?'
 'How do you react to that picture?'

BUT EXEMPLIFICATION IN TERMS OF ISOLATED QUESTIONS IS DANGEROUS. QUESTIONS SHOULD BE CLASSIFIED IN TERMS OF THE TEACHER'S APPARENT INTENTION? WHICH CAN ONLY BE ASSESSED ADEQUATELY BY CONSIDERING THE QUESTION IN ITS CONTEXT.

- (ii) Application/Comprehension Questions set tasks which require pupils to use concepts, principles or techniques which they have learned, or partly learned, in contexts which differ to some extent from the contexts in which they have previously been used. (Bloom, discussing objectives, distinguishes between Comprehension, the use of concepts in contexts similar to those in which they have previously been used, and Application, the use of concepts in unfamiliar contexts.) Such tasks include translating communication, extrapolating from a given sequence or trend, exemplifying a given concept, and applying a known technique or principle to a new situation. While tasks in this category are like those set by lower order questions in that they are concerned with particular ideas, they differ in that they are

aimed at helping pupils to elaborate and extend their use of these ideas.

- Examples: 'Ou est-ce-que vous allez?' (to a first-year class)
- 'Can you express this equation in words?'
- 'What does this sentence mean?'
- 'If everyone carried on behaving as they had been doing, what do you think would happen next?' (e.g. in a history class)
- 'Can you tell me other examples of towns built in this kind of position?'
- 'What principle which we were discussing recently is this an example of?'
- 'How would you solve this equation?' (one similar to others solved previously)
- 'Have we met any other problems similar to this?'

- (iii) Higher Order (Analysis/Synthesis) Questions set tasks which require pupils to use 'higher-order skills' of thinking. Questions of this kind can be seen as being less concerned with the particular ideas under discussion, but more with students practice, and hence, acquisition, of such general skills of thinking. (For virtually all such questions it would be easier for the teacher to explain to pupils an acceptable answer to the question, and this would usually be more effective if the teacher were solely concerned with pupils' comprehension of the particular ideas under discussion: the point of asking the questions is to lead pupils to engage in the activity of solving the problem themselves).

Higher-order questions include those which ask pupils to identify and explain relationships not previously perceived, to formulate hypotheses on the basis of given evidence, to devise ways of finding whether hypotheses are or are not valid, to formulate new generalizations, to justify claims by relating evidence to explicit criteria, to make inferences or predictions on the basis of given material, or to produce new or original ideas.

More generally, higher-order questions include any which ask pupils to analyse a confused or problematic situation in terms of constituent elements and their relation to one another, or which ask pupils to produce new ideas on the basis of such an analysis.

- Examples: 'What exactly is the problem here? What do we have to find out?'
- 'Can you suggest a possible explanation of these results?'
- 'We've looked at the meaning of some of the lines of this poem. But can you tell me what the poet is trying to say in the poem as a whole?'
- 'How would we test the validity of John's explanation?'
- 'Can we make any generalization, then, about the 1848 revolution?'
- 'Why do you think the government reacted as they did?'
- 'You say that corporal punishment is unfair. Can you explain to us why it's unfair?'
- 'Suggest a title which conveys the mood of this story.'
- 'Can you make up an advertisement for your school using the ideas we've been talking about?'

Pupil Responses, Prompting and Probing

If pupils are to learn from the tasks to which teachers' questions direct them, it is important that they should achieve success in these tasks. One is not likely to be motivated to do things at which one fails. There is evidence, for example, that pupils taught by 'discovery methods' acquire some ability at 'learning by discovery' if and only if they are initially presented with tasks which they can complete successfully.

'Higher order questions', then, should present real problems to pupils, but problems which they can successfully solve. This requires a very subtle choice of questions of the appropriate level of complexity and difficulty. It is inevitable, therefore, that in some cases one's initial questions will be too difficult; but in such cases, instead of abandoning the question, it is usually possible to modify the question, by breaking it down into parts, by giving clues, or by making it more 'structured' (e.g. presenting alternatives rather than asking a completely open question). In general one should expect an unanswered question or a clearly inadequate answer to a question, to be followed by such prompting from the teacher. In this way, the teacher will not be forced to abandon his plan for the lesson, and the pupils can achieve success in the tasks they are set.

For pupils to learn from set tasks, however, it is not sufficient that these answers should be accepted by the teacher. It is necessary that they should actually think through the problem which they have been given. Especially where pupils have not been accustomed to being set 'higher-order' tasks, their answers often indicate only a partial completion of the task. In particular, answers are often vague, lacking in detail, and, most important,

represent their conclusions without any justification being offered for these conclusions. It is then appropriate for the teacher to ask follow-up probing questions, asking pupils to clarify or elaborate upon their initial answers or asking them to provide arguments in support of their answers. Probing, and especially probing for support or justification, can be a particularly effective sort of questioning: instead of having to guess about what the appropriate level of difficulty for his questions, the teacher is starting from the pupil's own expressed ideas and asking the pupil to examine and develop these ideas.

Observation Procedure

Classify your questions in two ways:

First, decide whether your question is of a Lower Order, Application/Comprehension, or a Higher Order type.

Second, record your questions in sequence along the page, using the following symbols:

- q: all questions other than those defined below
- c: probing questions seeking clarification or elaboration of the pupil's initial response
- j: probing questions seeking justification or support for the pupil's initial response (automatically classified as Higher Order)
- p: prompts to pupils after an initial failure to respond (clues or reformulated questions making the original question easier).

qx, cx, etc.: questions which are not answered.

The record of part of a lesson might look as follows:

Higher Order										q	j		j	
Appl./Comp.					q	cx	c	q	q					
Lower Order	q	q	qx	p								q		

This means: three lower order questions, the last of which was only answered after a prompt; then a question of application, followed by probing for clarification, initially unsuccessful but achieved after further probing; two further questions of application, followed by one of synthesis, then probing for justification of the answer; then one lower order question, one probe for justification of the answer, and one question of application.

Goal of Microteaching: To teach by asking a variety of Lower Order, Application and Higher Order questions, using Lower Order questions as a basis for asking those of the other types; and to use prompting and probing wherever these are appropriate in the light of pupil responses.

Recording Sheet: Symbols defined as on previous page.

Higher Order																	
Appl./Comp.																	
Lower Order																	

Higher Order																	
Appl./Comp.																	
Lower Order																	

Higher Order																	
Appl./Comp.																	
Lower Order																	

Higher Order																	
Appl./Comp.																	
Lower Order																	

APPENDIX D

NOTES TO STUDENTS, ALTERNATIVE PROGRAMME

AUTUMN SEMESTER 1972

CLASSROOM
QUESTIONS:

An
Alternative
Course

These materials are being used as part of a programme of research.

They are taken largely from

Gall et al., 1971.

Higher Cognitive Questioning Teachers Handbook
California: Macmillan Educational Services, Inc.

QUESTIONS: TAXONOMY

THE IMPORTANCE OF TEACHERS' QUESTIONS

It is a truism that questions play an important role in teaching. Aschner (1961), for example, called the teacher "a professional question maker" and claimed that asking questions is "one of the basic ways by which the teacher stimulates student thinking and learning." Asking questions is also one of the ten major dimensions for studying teachers' behavior in Flanders' widely used system for interaction analysis (Flanders, 1970).

Certainly teachers ask many questions during an average school day. A half-century ago, Stevens (1912) estimated that four-fifths of school time was occupied with question-and-answer recitations. Stevens found that a sample of high school teachers asked a mean number of 395 questions each day. High frequencies of question use by teachers were also found in recent investigations: ten primary-grade teachers asked an average of 348 questions each during a school day (Floyd, 1960); twelve elementary-school teachers asked an average of 180 questions each in a science lesson (Moyer, 1966), and fourteen fifth-grade teachers asked an average of sixty-four questions each in a 30-minute social studies lesson (Schreiber, 1967). Furthermore, students are exposed to many questions in their textbooks and on examinations.

¹Parts of this section are taken from Meredith D. Gall, *The Use of Questions in Teaching*. *Review of Educational Research* 40: 707-721; 1970. Reprinted by permission of the American Educational Research Association.

Of course, teachers' questions are not an end in themselves; they are a means to help students learn. Recent studies by Taba, Levine, and Elzey (1964) and Hunkins (1967, 1968) indicate that certain types of questions are effective in increasing student achievement and ability to think critically.

At least ten systems for classifying teachers' questions have been proposed in recent years (Adams, 1964; Aschner, 1961; Bloom, 1956; Carner, 1963; Clements, 1964; Gallagher, 1965; Guszak, 1967; Moyer, 1966; Pate and Bremer, 1967; Schreiber, 1967). Most of these systems classify questions according to the type of thinking they require of students. The classification system for Minicourse 9 is a modified version of Bloom's taxonomy of cognitive objectives.

Whereas Bloom stressed written examination questions, we stress questions for classroom discussions. Also, we classify each question in terms of the teacher's objective in asking it. Consider this example: "Why did the poet write this poem?" If the textbook introduces the poem by saying that the poet wrote it to commemorate a historical event, the teacher would ask the above question in order to test the students' recall of the text introduction. This would be a *knowledge* question. If, on the other hand, the text contained no mention of the poet's motives, the teacher might ask the same question in an effort to have the students infer the poet's motives from specific information in the poem. In this case, "Why did the poet write this poem?" would be classified as an *analysis* question. Thus, the same question can be classified differently, depending upon the teacher's objective in asking the question.

Learning a taxonomy is valuable because it provides a conceptual framework for thinking about the types of questions you ask and your objectives in asking them. In our adaptation of Bloom's taxonomy there are six main types of questions, listed and described below. Each serves a different cognitive objective.

The Taxonomy

Knowledge

A question should be regarded as a knowledge question:

(a) if it requires the pupil to remember, either by recognition or recall, ideas, material or phenomena.

- e.g.
- i) Sheena, what is the second book of the Bible called?
 - ii) What does exit mean?
 - iii) Name the capital of Sweden
 - iv) List four cities in Victoria
 - v) When we added this powder to the water, what gas was given off?

(b) if it seeks to establish the pupils' range of experience, generally to establish a framework within which to develop the lesson.

- e.g.
- i) Have you heard of the Consumers' Society?
 - ii) Do you know anything about Pegasus?
 - iii) Does your grandfather forget things?
 - iv) Are you first year students?

Comprehension

A question should be regarded as a comprehension question:

when, from information given in the lesson, the pupil is asked to organize, to make some use of, or to perceive the structure of the material or ideas contained in the information.

Although not intended to include all possible varieties of comprehension questions, the following should be regarded as comprehension:

- e.g.
- i) requiring a description in pupil's own words.

T: Describe what happened after I placed the sodium in the water.

ii) requiring the statement of a main idea in pupil's own words.

T: What does the poet try to tell us in the second verse?

iii) requiring a comparison.

T: How does the population of Scotland today compare with that before the Second World War?

Application

A question should be regarded as an application question:

when, on the basis of knowledge which the teacher knows the pupil has already acquired, the pupil is asked to apply this knowledge to a new situation.

e.g. i) T: Using these principles as the criteria, with which schools are these painters most closely associated?

or ii) Having discussed the characteristics of television advertising -

T: What would you put into an advertisement to sell a hair restorer?

Analysis

A question should be regarded as an analysis question if:

the pupil is required to break down the material into its constituent parts, to detect the relationship of the parts and the way they are organized.

Although not intended to include all possible varieties of analysis questions, the following should be regarded as analysis:

- e.g. i) The pupil is asked to establish relationships he had not previously realized, to explain relationships by identifying motives or causes.
- T: Why do children spend much of their playtime imagining things and living in fantasies?
- or T: How did the minister's statement result in this action by the parents?
- or T: What is common to all those problems?
- ii) the pupil is asked to make inferences based on given material.
- T: What does this poem tell us about the poet's own house?
- or T: Now that we have watched our "mini-garden" for three months, what can we say about the needs of plants?
- iii) the pupil is required to find evidence to support generalizations.
- T: What evidence does our experiment provide that the metal is copper?
- or T: Could you suggest why this writer believes a population crisis in the world to be highly probable within the next 50 years?

Synthesis

A question should be regarded as a synthesis question:

(a) when the pupil is intended to draw upon elements from many sources and to put these together into a structure or pattern not clearly there before - a product will result.

Although not intended to include all possible varieties of synthesis questions, the following should be regarded as synthesis.

e.g. i) the pupil is asked to make a prediction from the consideration of all the evidence at his disposal.

T: What changes in Education policy would occur if there were a change in government?

or T: What hypotheses can we generate from this data?

ii) the pupil is asked for an original solution to a problem.

T: How could we overcome the shortage of water?

or T: What actions should be taken to counter unemployment in Stirling?

iii) the pupil is asked to produce an original communication.

T: What does it mean to France to be surrounded so much by water?

or T: What would you say to the public to encourage their support for your plan?

(b) when the pupil is asked to adopt a position or stand regarding an issue or makes a judgement.

This type of question would involve two steps

- the setting up of standards or value structures, and

- the determination of how closely the idea or objects meet those standards or values.

e.g. T: Give me a reasoned argument to support the contention that "The rich get rich and the poor get poorer".

FACT QUESTIONS VERSUS HIGHER COGNITIVE QUESTIONS

Teachers generally agree that they should emphasize the development of students' skill in thinking as well as in learning and recalling facts (Aschner, 1961; Carner, 1963; Hunkins, 1966), yet research spanning more than a half-century indicates that teachers usually neglect higher cognitive questions.

Probably the first serious study of this issue was done by Stevens (1912). She found that, for a sample of high school classes varying in grade level and subject area, two-thirds of the teachers' questions required direct recall of textbook information. Two decades later, Haynes (1935) found that 77 percent of teachers' questions in sixth-grade history classes called for factual answers; only 17 percent were judged as requiring students to think. In Corey's study (1940), three judges classified all questions asked by teachers in a one-week period in a laboratory high school. The judges classified 71 percent of the questions as calling for factual answers and 29 percent as requiring thoughtful answers.

Studies conducted in the last decade indicate that teachers' questioning practices are essentially unchanged. Floyd (1960), who classified the questions of a sample of forty "best" teachers in elementary classrooms, found that specific facts were called for in 42 percent of the questions; only 20 percent required thoughtful responses. In two other studies conducted at the elementary school level (Guszak, 1967; Schreiber, 1967), similar percentages of fact and thought questions were asked. At the high school level, Gallagher (1965) and Davis and Tinsley (1967) classified the questions asked of gifted students by both teachers and student teachers. More than half the questions asked by both groups were judged to test students' recall of facts.

The findings in studies on teachers' questioning practices are fairly consistent. It is reasonable to conclude that in a half-century there has been no essential change in the types of questions teachers emphasize in the classroom. About 60 percent of teachers' questions require students to recall facts, and about 20 percent require students to think; the remaining 20 percent are procedural.

USING HIGHER COGNITIVE QUESTIONS IN CLASSROOM INSTRUCTION

The purpose of Minicourse 9 is to help you change your teaching strategies so that you will make greater use of higher cognitive questions. This will help your students develop their ability to think carefully and logically about a subject, in a sustained way. In this course, we have emphasized using higher cognitive questions in discussions rather than in tests or written assignments because discussions enable you to interact immediately with students. Also discussions develop students' ability to express their ideas and opinions verbally in the presence of peers.

The instructional films show how you can use higher cognitive questions in various classroom teaching situations. Three subject areas are stressed:

1. *Reading and Literature:*

One of the major objectives of reading instruction is to develop students' comprehension skills. Teachers ask many *knowledge* questions of the *who, what, where, and when* type to develop comprehension of facts. Less frequently, teachers attempt to develop comprehension skills that involve the ability to think critically and imaginatively about what one has read. In Minicourse 9 you will see several examples of how teachers use higher cognitive questions in reading groups to develop these skills. Later chapters of this handbook contain curriculum materials to practice writing and classifying higher cognitive questions that you might use in developing students' broader comprehension skills.

2. *Science:*

The emphasis in science instruction today is to provide experiences for students to observe at first hand the phenomena covered in their texts. For example, when teaching the laws of periodic motion, you might have students play and experiment with a pendulum. As they do this, you can ask *knowledge* questions about *what* they are observing, but you can also ask higher

cognitive questions to encourage them to *think* about the phenomena under observation—particularly, *why* the phenomena occur and what might happen if conditions were to be changed.

3. *Social Studies:*

In social studies, too, the trend is to provide more concrete experiences as a basis for student learning. Furthermore, the *inquiry* method of teaching is favored so that the student makes his own generalizations and interpretations on the basis of what he has observed. As you will see in the instructional films, higher cognitive questions, especially those of the *analysis* type, are an essential feature of the inquiry method.

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KNOWLEDGE, COMPREHENSION, AND APPLICATION QUESTIONS

As we explained previously, in our adaptation of Bloom's taxonomy there are six main types of questions. Each serves a different cognitive objective.

Knowledge Does the student remember what he has seen or read?

Comprehension Can the student organize what he knows?

Application Can the student apply techniques and rules to solve problems that have single correct answers?

Analysis Can the student identify motives and causes, make inferences, and find examples to support generalizations?

Synthesis Can the student make predictions, solve problems, or produce original communications, such as plays, stories, and posters?

Evaluation Can the student ^{substantiate} opinions about issues, judge the validity of ideas, judge the merit of problem-solutions, or judge the quality of art and other products?

which follow

Lessons/ questions. This and *application* questions. emphasize *analysis, synthesis, and evaluation* lesson introduces *knowledge, comprehension,*

Their primary value is as building blocks. For example, *knowledge* questions elicit facts that your students can use in thinking about a higher cognitive question. Also, if a student is unable to answer a higher cognitive question, you can use *knowledge* and *comprehension* questions to help him develop an answer.

KNOWLEDGE QUESTIONS

A student can answer a *knowledge* question if he can remember the information that was presented to him. There are two types of *knowledge* questions:

1. *Recalling facts or observations.*
2. *Recalling definitions.*

For example, suppose you ask students to read the following passage:

There is only one city in the world which has a larger population of Mexican descent than Los Angeles, and that is Mexico City. The State of California had 760,453 residents with Spanish surnames in 1950.

The mass immigration of Mexicans into California began in 1910. Manpower was needed so badly in California that the Chamber of Commerce encouraged migration from Mexico. During the depression, however, the same Chamber of Commerce started a campaign to send workers back to Mexico. In 1932, the Los Angeles Board of Supervisors began a policy of offering free one-way tickets to Mexico.¹

¹ Adapted from *The Indian in America's Past*, Jack Forbes (ed.). New York: Prentice-Hall, Spectrum Books, 1964 (p. 164).

To test students' recall of the *facts* in this passage, you can ask *knowledge* questions such as:

1. *What* city has a larger population of Mexican descent than Los Angeles?
2. *When* did the mass immigration of Mexicans into California begin?
3. *Who* encouraged migration from Mexico?
4. *Why* did the Chamber of Commerce encourage migration from Mexico?
5. *What* policy did the Los Angeles Board of Supervisors begin in 1932?

To test students' recall of *key words* used in the passage, you can ask:

1. What does *descent* mean?
2. What is a *surname*?
3. What is *immigration*?

Note that all the answers to the questions about facts can be obtained directly from the passage. In answering these questions, students do not need to think about the problems and prejudices implied, although a good teacher could use higher cognitive questions to move students' thinking from the knowledge level into analyzing issues that the passage raises.

In asking the questions about definitions, your objective is to determine whether the students remember the meaning of these words from previous lessons or experience. If students do not know the meanings and you ask them to guess the meaning from the context of the passage, these questions become higher cognitive questions.

Teachers generally ask many *knowledge* questions in a class period. These questions usually *ask who, what, where, and when.*

Notice that question 4 in the example began with *why*. You might think that *why* questions always call for higher cognitive thinking. They usually do, but question 4 is classified as *knowledge* because the answer is given in the passage.

For a *why* question to qualify as a higher cognitive question, it must satisfy the criteria:

the student gives his own explanation, not one from the textbook.

It is important, of course, to ask *knowledge* questions. Without a fund of relevant facts, students will not be able to think and act intelligently. However, students should not be expected to remember all the facts presented in a lesson. The key word here is *relevance*. In the case of a reading exercise, students should be expected to read the entire lesson, but to remember only the most relevant facts. In deciding what is relevant, the teacher should emphasize facts that help students build concepts and generalizations.

Educational Objective

Knowledge questions test students' recall of facts and knowledge of word meanings, and seeks to establish the pupils' range of experience.

Teacher Activity

In framing *knowledge* questions for use in class discussions, the teacher identifies relevant facts and key words presented in the lesson. He then constructs *knowledge* questions to test students' recall of these facts and definitions.

Student Activity

To answer a *knowledge* question, the student needs only to recall what he has read or observed.

Now please turn to the next page. Note that this excerpt, like the others you will be studying, was selected because it is representative of current teaching materials. Following the excerpt is a list of questions prepared for class discussion. You will be asked to identify which of these are *knowledge* questions.

Exercises**TRIAL OF JOHN PETER ZENGER, 1735**

Please read the following excerpt:

John Peter Zenger printed a newspaper in New York. He did not like the way Governor Cosley was ruling the colony. Zenger wrote newspaper articles about some of the bad things that the governor was doing. He was arrested for libel and brought to trial.

The Attorney General, who represented the Governor, asked Zenger if he had printed the articles against Governor Cosley. Zenger admitted printing the articles. The judges in the court then said that the jury had to find John Peter Zenger guilty of libel. Zenger's lawyer got up. He said he could prove that everything Mr. Zenger had printed was true. He demanded that Mr. Zenger be freed.

The Attorney General said that it didn't make any difference whether or not Mr. Zenger had printed the truth. The judges knew that Mr. Zenger had printed bad things against the Governor. They said that was libel. They said the jury had to find him guilty.

Mr. Zenger's lawyer appealed to the jury. He said that they were all neighbors of Mr. Zenger. They knew that the things he printed were true. He said that in this country, a man should be free to print the truth. Truth, he argued, was the most important issue in the case. Printing the truth could not be libel.²

²From the revised experimental edition of *Law in a New Land: A Casebook for Intermediate Grades*, Robert H. Ratcliffe (ed.). Chicago: Law in American Society Foundation, 1969 (pp. 38-39).

Below are a number of questions a teacher might ask his class about the excerpt on the preceding page. Your task is to identify which of them are *knowledge* questions. Put a "K" in the blank space if it is a *knowledge* question, an "O" if it is any *other* type of question. *Important:* Because it is not always possible to classify questions on the basis of wording alone, the teacher's objective is given in brackets. We suggest you read the objective before deciding how to classify the question.

1. When did this trial take place?
[Teacher wants student to recall a given fact.] _____
2. Did Mr. Zenger admit that he had printed articles against Governor Cosley?
[Student must remember information he has read.] _____
3. Why should the Governor want Mr. Zenger in jail?
[Student must analyze personal motives.] _____
4. What did Mr. Zenger's lawyer say to the jury?
[Student must recall information from the passage.] _____
5. Who did the Attorney General represent?
[Student must remember a fact.] _____
6. If you had been on the jury in the Zenger case, what would you have decided? Why?
[Student must evaluate and then give support for his answer.] _____
7. Should a newspaper be allowed to print anything as long as it's true? Why?
[Student takes a stand on a controversial issue.] _____
8. How do you think the jury voted in this case?
[Student makes a prediction.] _____

Turn the page to check your answers.

Answers

Here are the answers. Remember, a *knowledge* question requires only that a student recall a fact or make a simple observation.

- | | |
|------|------|
| 1. K | 5. K |
| 2. K | 6. 0 |
| 3. 0 | 7. 0 |
| 4. K | 8. 0 |

If you made an error, it will be helpful for you to reread the question and its objective.

COMPREHENSION QUESTIONS

Knowledge questions require students to recall facts. *Comprehension* questions require students to organize facts in various ways:

Comprehension

A question should be regarded as a comprehension question:

when, from information given in the lesson, the pupil is asked to organize, to make some use of, or to perceive the structure of the material or ideas contained in the information.

Although not intended to include all possible varieties of comprehension questions, the following should be regarded as comprehension:

e.g. i) requiring a description in pupil's own words.

T: Describe what happened after I placed the sodium in the water.

ii) requiring the statement of a main idea in pupil's own words.

T: What does the poet try to tell us in the second verse?

iii) requiring a comparison.

T: How does the population of Scotland today compare with that before the Second World War?

Educational Objective

Comprehension questions test whether students can organize and select facts and ideas presented in a lesson. For example, the question, "Describe the main character's personality," requires the student to organize a set of facts he has recalled and put them together in the form of a description. The question, "How are these two poems similar?," requires the student to recall facts about each poem and then select those facts that reflect similarities between them.

Generally, *comprehension* questions do not call for information outside the immediate lesson. For example, consider the question, "Tell us in your own words why ice floats." If the explanation is given in the lesson, then the question is of the *comprehension* type. If the answer is not given, and the student must think of his own explanation, the question becomes an *analysis* question. This distinction will become clearer when you study *analysis* questions. Although they are not as difficult as higher cognitive questions, *comprehension* questions are important because they require students to organize and select facts in order to give an answer.

Teacher Activity

In framing *comprehension* questions for class use, the teacher selects the main facts and ideas in the lesson. Then he frames questions to test students' ability to organize and select from among these facts and ideas. These questions take the form of asking for descriptions, main ideas, or similarities and differences.

Student Activity

To answer a *comprehension* question, a student needs to know the main facts and ideas presented in the lesson. Then he needs to be able to organize these facts and ideas so that he can display the understanding required by the question.

Exercises

Please study the following poems:

1. Solomon Grundy

Solomon Grundy,
 Born on Monday,
 Christened on Tuesday,
 Married on Wednesday,
 Took ill on Thursday,
 Worse on Friday,
 Died on Saturday,
 Buried on Sunday,
 This is the end
 of Solomon Grundy.³
 Gustav Tenggren

2. Solomon Grundy

Solomon Grundy
 Walked on Monday
 Rode on Tuesday
 Motored on Wednesday
 Planed on Thursday
 Rocketed Friday
 Spaceship Saturday
 Time Machine Sunday
 Where is the end for
 Solomon Grundy?⁴
 Frederick Winsor

³From *The Tenggren Mother Goose*, by Gustav Tenggren. Boston: Little, Brown and Company. Copyright, 1940 by Western Printing and Lithographing Company.

⁴From *A Space Child's Mother Goose*. Copyright © 1956, 1957, 1958 by Frederick Winsor and Marion Parry. Reprinted by permission of Simon and Schuster.

Below are a number of questions a teacher might ask his class about the excerpts on the preceding page. Put a "K" in the blank space if it is a *knowledge* question, a "C" if it is a *comprehension* question. Please read the objective before classifying the question.

1. Who is the main character in these poems? _____
[Teacher wants student to name the main character.]
2. In your own words, describe briefly what Solomon Grundy did in the first poem. _____
[Teacher wants student to give a description.]
3. What is a *time machine*? _____
[Teacher wants student to recall a definition learned previously.]
4. What is the main idea of the second poem? _____
[Student is required to give the main idea in his own words.]
5. How are these two poems alike? _____
[Student must consider both poems and find similarities.]
6. Can you mention some differences? _____
[Student is asked to consider both poems and find differences.]
7. Poem No. 2 finishes with, "Where is the end for/Solomon Grundy?" What do these lines mean? _____
[Teacher asks student to put an idea into his own words.]
8. What is the difference between a rocket and a spaceship? _____
[Student must find differences between two known modes of space travel.]

Turn the page to check your answers.

Answers

1. K
2. C
3. K
4. C
5. C
6. C
7. C
8. C

If you made an error, it will be helpful for you to reread the question and its objective.

APPLICATION QUESTIONS

Application questions set up a problem situation that the student is required to solve with knowledge he has acquired.

For example, the following are *application* questions:

1. Can you solve this equation? $12 = a^2 + 2a$
2. If a person is planning to bathe in the sun, at what time of day is he most likely to receive a severe sunburn? [The student needs to apply facts he has learned about the sun's movement and radiation to a specific problem situation.]

You are most likely to ask *application* questions in science and mathematics classes. However, there are instances in social studies and literature when technical knowledge may be applied to a problem. For example, your class may be studying characteristics of various types of

poetry--lyric, ballad, ode, sonnet, etc. Then you may give your students a collection of poems and ask them to identify each poem by type. To classify the poems, the student would need to apply the technical terms. In social studies, you might present the class with various situations and ask your students what previously learned principles they exemplify. For example, you might describe the governments of various countries and then ask students to decide which is a theocracy, monarchy, oligarchy, republic, democracy, etc.

The important thing to remember in classifying *knowledge*, *comprehension*, and *application* questions is that

the students must have the necessary knowledge readily at hand. *Synthesis* questions, which you will study also require students to solve problems, but these problems are open-ended and have many possible solutions. For example, "How could you make this skirt without a pattern?" and "What can our class do to raise money for the school picnic?" are *synthesis* questions. Answering *synthesis* questions requires a higher level of thinking than does answering *application* questions.

Educational Objective

It is important that students be able to apply technical terms, concepts, rules, principles, and formulas in new situations. *Application* questions give students practice in applying their knowledge by solving problems.

Teacher Activity

The teacher identifies technical terms, rules, concepts, principles, or formulas that students have learned. Then he constructs problem situations that require the student to apply this knowledge.

Student Activity

To answer an *application* question, the student needs to know and be able to select the technical terms or rules that are needed to solve a particular problem.

Now turn the page.

Exercises

Please read the following excerpt:

CAN YOU HELP MR. DU MARCHÉ?

Mr. Du Marché, the world-famous interior decorator, owns a factory in Georgia that manufactures armchairs. You are the bookkeeper for his factory. Now it is the end of the year, and he wants to know if he has made a profit or a loss. Here is what you need to know to find out (taken from Mr. Du Marché's ledger):

Chair Sales = Revenue =	\$ 20,000
The cost of the wood, nails, cloth, and other materials used in manufacturing the chairs totaled	3,000
Wages paid to employees totaled	16,000
The utility bill—heat, electricity, and water—was	1,000
He paid himself a salary of	3,000 ⁵

⁵From *Economic Man: Buyer and Seller (Book 2)* by William D. Rader (Project Director), Katherine E. Chapman, Michael Kassera, Robert W. Klepper, and Linn Orear. Westchester, Illinois: Benefic Press, 1971, (p. 21). Reprinted by permission of the Elementary Economics Project at the Industrial Relations Center of the University of Chicago.

Below are a number of questions a teacher might ask his class about the excerpt on the preceding page. Use the following key to fill in the blank spaces:

K = Knowledge

C = Comprehension

A = Application

1. What is this problem about? _____
[Student must put the ideas into his own words.]
2. What does Mr. Du Marché's factory manufacture? _____
[Teacher wants student to identify a fact from the ledger.]
3. What did Mr. Du Marché pay in wages to his employees? _____
[Teacher wants student to identify a fact from the ledger.]
4. What were Mr. Du Marché's expenses? _____
[Student must repeat facts from the ledger; no organization of facts is required.]
5. What was the total amount of his expenses? _____
[Student is required to solve a mathematical problem.]
6. Tell me in your own words what *profit* and *loss* mean. _____
[Students have read a definition; teacher asks student to define in his own words.]
7. Did Mr. Du Marche make a profit or loss for the year? _____
[Student must compute to solve this problem.]
8. What was the amount of his profit or loss? _____
[Student must compute.]

Turn the page to check your answers.

Answers

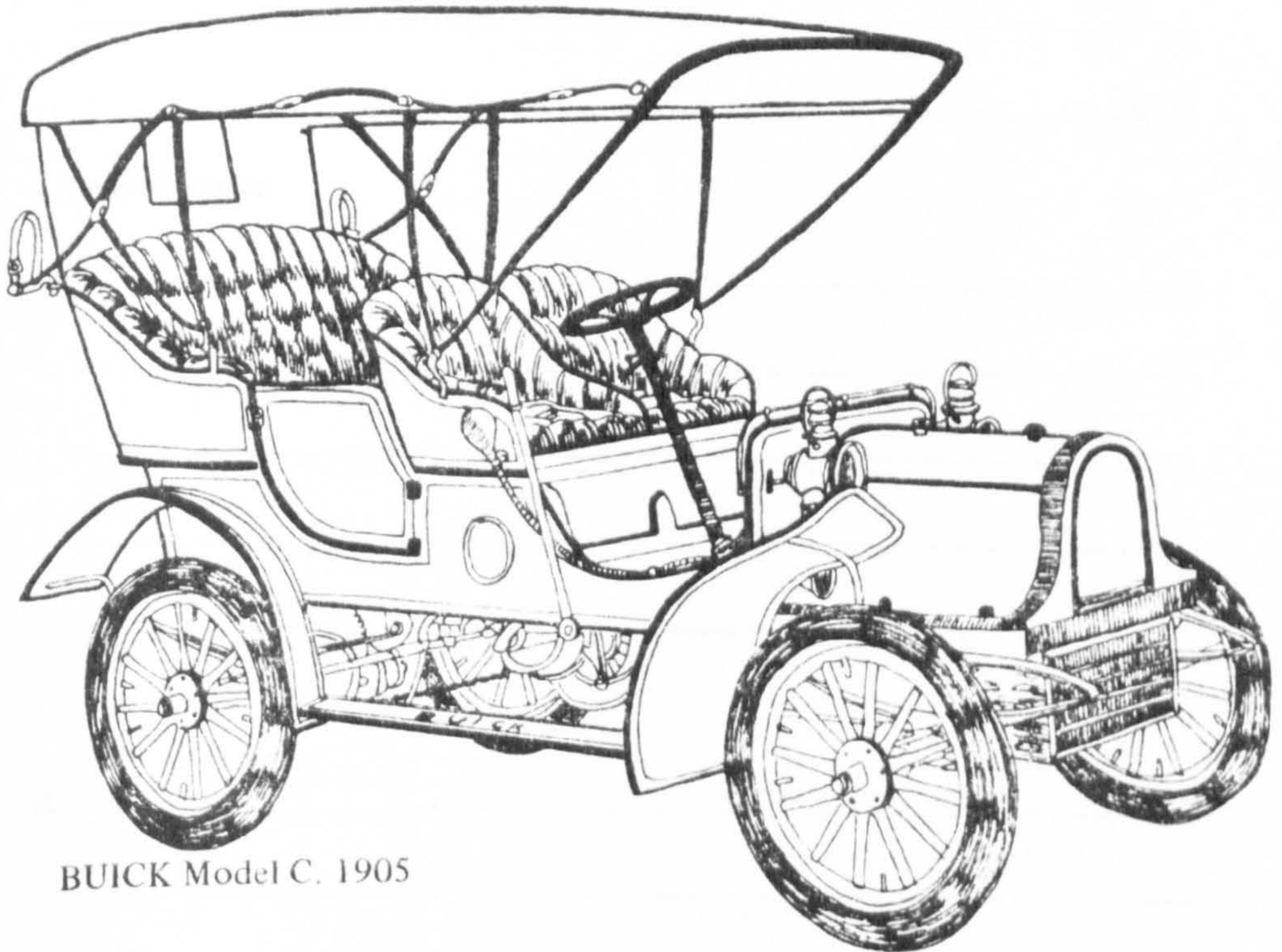
1. C
2. K
3. K
4. K
5. A
6. C
7. A
8. A

If you have made an error, it will be helpful for you to reread the question and its objective.

Please study the material on this page for a few minutes.

U.S. MOTOR VEHICLES SOLD BY FACTORIES

<i>Year</i>	<i>Cars</i>	<i>Trucks & Buses</i>
1900	4,192	---
1905	24,250	750
1910	181,000	6,000
1915	895,930	74,000
1920	1,905,560	321,789
1925	3,735,171	530,659
1955	7,920,186	1,249,090
1968	8,222,000	1,896,000



BUICK Model C. 1905

In 1905, automobiles were expensive, and most of them were owned only by rich people. Tires alone cost \$50 per 1,000 miles of use. This model car was advertised for \$1,200.⁶

⁶ From *Economic Man: Buyer and Seller (Book 2)* By William D. Rader (Project Director), Katherine E. Chapman, Michael Kassera, Robert W. Klepper, and Linn Orear. Westchester, Illinois: Benefic Press, 1971 (p. 112). Reprinted by permission of the Elementary Economics Project at the Industrial Relations Center of the University of Chicago.

Compose questions you might ask your class about the material on the preceding page. Compose questions in each category listed.

Knowledge

1. _____

Comprehension-

1. _____

2. _____

3

Application

1.

2.

3.

You may wish to compare your questions with the ones we wrote:

Knowledge

1. How many cars were sold in 1968?

Comprehension—Giving a Description

1. What does this page tell us about?

Comprehension—Stating the Main Idea

1. Summarize in one sentence the purpose of the chart.

Comprehension—Comparing

1. How does the number of buses sold in 1968 compare with the number sold in 1905?

Application

1. In 1905, tires cost \$50 per 1,000 miles of use. If a person drove 12,000 miles a year, how much would tires cost him?
2. What was the percentage of increase in cars from 1900 to 1905?
3. What was the ratio of trucks and buses to cars in 1968?

IMPROVING THE QUALITY OF STUDENT ANSWERS

the questioning skills

Throughout /you will be asking students the kind of questions that help develop skills in critical thinking. One problem in developing students' thinking is that you cannot observe thinking directly, but must observe the end-product, the answer to a question. Thus, at the outset, it is important to consider how students will react to your questions. What kind of responses should you expect? How can you help students give good answers? Probably the most important gain your students can have *is* a sense of *competence*, the perception that they can answer difficult questions, that they do have opinions and worthwhile thoughts, and that they can contribute constructively in discussions.

Most students are accustomed to "discussions" in which the teacher does most of the talking and they participate by supplying brief, undeveloped answers to the teacher's questions, which are mostly factual. This pattern needs to be broken if discussion is to foster critical thinking. Basically, we believe that students will gain skill in using knowledge and in expressing themselves if teachers talk with students about answering higher cognitive questions, and then *listen* to what students have to say, asking probing questions to help them improve their answers.

CRITERIA FOR JUDGING STUDENT RESPONSES

Listed below are seven criteria for evaluating students' responses. The first four criteria are a minimum base from which to build thoughtful replies; the last three criteria are goals to strive for in eliciting high-quality student responses.

we will concentrate on No. 5—*support*—because failing to give support is one of the most common problems of students

Also, support is one of the most important criteria for our purposes. To determine whether students are thinking critically, whether they are giving good answers to *analysis*, *synthesis*, and *evaluation* questions, you will need to know how valid a rationale they can provide for their answers.

<i>Criterion</i>	Desired Response
1. Clarity	The student answers in understandable English without mumbling, failing to finish, or confusing his thoughts.
2. Accuracy	The student's answer contains no factual errors and is based on accurate information.
3. Appropriateness	The student answers the question that was asked.
4. Specificity	The student clearly identifies who and what he is talking about.
5. Support	The student gives reasons, facts, or examples to support his statement, or he explains the criteria or assumptions on which he bases his opinion.
6. Complexity	The student's answer shows that he is aware that there are many ways of looking at the problem being discussed, and that they must be considered before a valid judgment can be reached.
7. Originality	The student draws upon current knowledge and past experience to create or discover ideas that are new to him.

These seven criteria are listed in approximate order of difficulty for most students. To participate in class discussions, students must be able to answer clearly, accurately, and appropriately. With practice, they should

learn to be specific and to support their statements. As they begin to think more critically, their responses will become more complex and original.

Whether a student response satisfies one or more of the above criteria will be decided by your subjective judgment as a teacher. Some categories overlap. Not all are equally applicable to a given situation. You know your students' problems and capabilities; we present these as guides to help you evaluate performance. On the following pages is a dialogue taken from a fifth grade group discussing an economics lesson. In the lesson materials, a boy named Adam Smith is marooned on a deserted island in the South Pacific and must build a new life from the resources he finds there.¹ To develop your own performance standards, see if you can apply our criteria to these interactions:

Dialogue

Teacher What do you think you would do first if you were in Adam's place?

Fred I wouldn't be in his place to begin with.

Exercise

Is Fred's response *appropriate*?

Yes _____ No _____

Answer

No. This response is typical of some students, but it is *not appropriate* because the student hasn't done the kind of problem-solving that the teacher was asking for. Possibly Fred can support his answer if the teacher asks him to explain how he would avoid getting into situations like Adam Smith's, but this is only tangentially related to the purpose of the teacher's question. To draw Fred into the discussion in a positive way, the teacher might ask for a temporary agreement and repeat the question: "Let's assume that you *were* in Adam's place even though you can think of ways to avoid getting shipwrecked. What would you do first?"

¹ Adam Smith's plight is described in *Economic Man: Producer and Consumer (Book 1)* by William D. Rader (Project Director), Katherine E. Chapman, Michael Kassera, Robert W. Klepper, and Linn Orear. Westchester, Illinois: Benefic Press, 1971.

Dialogue

Teacher Do you believe that Adam will be able to survive on this island?

Nancy Yes.

Teacher Why?

Nancy Because he has food and water. And he has his sculptor's tools.

Exercise

Is Nancy's response *supported*?

Yes _____ No _____

Answer

No/Yes. Nancy's initial response was *not supported*, but a follow-up question elicited three good reasons. There are other reasons that could be given, and so a second follow-up question might be appropriate: "What else does Adam have that will help him survive?"

Dialogue

Teacher Adam has to decide where he is going to live. Which area of the island do you think he will choose? Brad?

Brad The beach.

Exercise

Is this response *supported*?

Yes _____ No _____

Answer

No. This response is not supported. Follow-up questions might elicit more support: "Why do you think he will choose the beach?"

Dialogue

Teacher Adam will probably choose not to live in the Cloud Forest area of the island. Why?

Jeff It's too far from the beach, and there isn't much food there.

Exercise

Is Jeff's response *supported*?

Yes _____ No _____

Answer

Yes. This response is *supported*. The student gives two reasons to support the teacher's generalization. Further questions might elicit several other reasons.

Dialogue

Teacher From the bamboo he has gathered, Adam can make a pipeline, a bench, or a stool. What do you think he should make?

Joey A bench or a stool—um, well, I don't know. Um, maybe a pipeline because, um, he needs water. But he needs a stool, too.

Exercise

Is Joey's response *clear*?

Yes _____ No _____

Answer

No. We think this response is *not clear*. The student starts an answer but then thinks of another answer and doesn't finish his original idea. Follow-up questions should help Joey straighten out his ideas and decide which item is most important.

Dialogue

Teacher After the second storm, there are twelve more people on the island. How do you think that will change Adam's way of life?

Jim Well, they can do more things.

Teacher What things?

Jim They can help each other.

Exercise

Is Jim's response *specific*?

Yes _____ No _____

Answer

No. This answer is *not specific*. The student does not identify who and what he is talking about. Even a follow-up question fails to elicit a significantly improved response.

Dialogue

Teacher The newcomers traded goods with Adam and his friends before they moved inland to build a new settlement. Can anybody explain why Adam was willing to trade?

Susan Well, a person wants to trade what he has for something that he wants more. That's what "trade" means. The newcomers had some things that Adam wanted.

Exercise

Is Susan's response *accurate*?

Yes _____ No _____

Answer

Yes. Susan's response is *accurate*. The lesson that deals with trading enabled Susan to make an accurate generalization about this concept.

Dialogue

Teacher Some of the people on the island think they should specialize and spend more time producing the goods they make best. Other people think that sharing goods fairly will be hard and that each person should take care of himself. What do you think about this?

Sam I think they should specialize because they will produce more that way. And everybody will have more.

Exercise

Is Sam's response *complex*?

Yes _____ No _____

Answer

No. This response is *supported*. The student gives a reason for his opinion. This answer is also *clear, accurate, and appropriate*. It is certainly a good student response. However, it is *not complex* because the student fails to show he has seriously considered the valid points in the other argument. To help Sam see this, the teacher might ask a follow-up question: "If everyone specializes, how would you solve the problem of making sure everyone gets a fair share of all the goods?" Few students will give *complex* answers at first, but in time brighter students will be able to give them.

Now here's a longer segment of dialogue for you to consider:

Dialogue

Teacher If the seaplane spots them, the islanders who want to can return to the outside world. Suppose six of them, any six, decide to leave, and six decide to stay. What effect would this have on the economic life of the remaining islanders?

Tim Well, things wouldn't be so good.

Teacher All right. Why?

Tim They wouldn't have as many goods to exchange. And everybody would have to work harder.

Teacher Would they have any other problems. Joey?

Joey Well, if Mr. Lee left, José and Malia wouldn't learn how to cultivate plants. And if Captain Ben left, there wouldn't be anyone to marry Lep and Ulai.

Teacher So you are saying that the settlers are going to have problems if some of the islanders leave. What could the remaining six do to improve their life?

Tim They could try to talk the other six out of leaving.

Teacher All right.

Joey They could make a rule that the others couldn't leave.

Teacher Uh huh.

Rhonda They could advertise for other settlers. They could ask the pilot to hunt for settlers, or they could write letters to outside newspapers saying what the island is like and what skills they need. They might end up better than before.

Teacher Steve?

Steve Now that they've contacted the outside world, they'll have to start a government. They'll have to decide who can come to the island, and where they will live, and how many people they need. They can trade a lot more now, too, so the government'll have to say what prices should be and establish a money system that they can use with the outside world.

Teacher Good. You've all done some good thinking in this discussion.

Exercise

Is Rhonda's response *original*? Is Steve's?

Rhonda	Yes	_____	No	_____
Steve	Yes	_____	No	_____

Answer

Rhonda/Steve: Yes. We think both responses are *original*, particularly in comparison with the responses of the other two students. An idea doesn't have to be earthshakingly new to be original; it only needs to be new to the student who thinks of it. Both Rhonda and Steve show imagination in their approach to the plight of the six remaining islanders.

THE VALUE OF PERFORMANCE CRITERIA

We have introduced these seven criteria because we think your micro-teach sessions will be more rewarding if you have a conceptual framework for thinking about students' answers. Knowing what you mean by a *clear* or a *supported* answer helps you identify aspects of students' responses that can be improved. This framework also provides specific goals to strive for in helping students give better responses.

We think it will also be helpful if you think about the answers that you want for each question you ask in your microteach sessions. For example, in the microteach session . . . you are asked to plan about ten questions of any type and be prepared to ask probing questions to elicit more student responses that are well supported. If you also take the time to write out or think through what you would consider to be good answers to your questions, you will be in a better position to elicit them.

TALKING WITH STUDENTS ABOUT PERFORMANCE CRITERIA

Another way you can help students is by talking with them about the type of questions you are asking and the kind of answers you want them to give. Here is one way to do it:

Teacher I'm going to be asking questions that require you to think really hard. For most questions there won't be just one right answer; there'll be many good answers. I'll give you time to think. You think carefully, and then when you answer try to explain what you mean. Give the reasons why you think the way you do. Give examples that support your opinion. Tell us how you arrived at your answer.

The Lesson 1 Film gives you several other examples of how to introduce students to higher cognitive questions. For example, you can ask your students to compare fact and thought questions and explain how they are different. Or you can ask students to compare several answers to the same question and explain how they differ in clarity, support, or imagination.

You can also introduce your students to a simplified version of our seven criteria. You will probably *not* want to talk to your students about all seven; we suggest that you choose two or three that are most appropriate. Be sure, however, to include the fifth criterion: support. The criteria can be explained to students in these terms:

Teacher We're going to be having many discussions this month. In our discussions we'll be talking about some difficult problems, and you'll have to do some hard thinking to come up with good answers. These are going to be thought questions, so there will be many possibilities for good answers. To be a good participant in a discussion like this, where people are really thinking hard, you must do these things [choose several criteria, rephrase them to suit your students, and jot them on the blackboard]:

Speak clearly and finish your ideas.

Clarity

Make sure you have the facts correct.

Accuracy

Listen carefully to make sure you are answering the question that was asked.

Appropriateness

Be sure to tell who and what you are talking about so other people can understand.

Specificity

Explain your answer: tell why you think the way you do; give reasons and examples to support your opinion.

Support

Try to consider all sides of a problem before you give your answer; tell how you made up your mind and why.

Complexity

Use your imagination; think of unusual ways to approach problems.

Originality

Besides talking with students about these criteria, you should bring them up in your discussions. It is also important to draw students' attention to their answers, and to ask a student if he thinks he has given a good answer, and to ask other students what they can contribute to make a good answer even better.

ASKING PROBING QUESTIONS AS A FOLLOW-UP TECHNIQUE

The most direct way to help students give good answers is by asking probing questions. Essentially, probing questions require a student to develop the quality of his initial response. The particular type of probing question you will ask depends on which aspect of the student's response you are trying to improve. That is, you can probe for *clarity, accuracy, appropriateness, specificity, support, complexity, or originality*.

we will ask you to concentrate on probing for support, although you will probably want to consider other criteria as well. Probing questions have no set form because they are tailored to improve a specific student's response with respect to a particular criterion.

Study this dialogue between a teacher and a student:

Teacher What can the schools do to keep young people from dropping out?

Student Change.

- Teacher** Who should change what? [Probing for *specificity*.]
- Student** Well, administrators should let students have more freedom.
- Teacher** Can you be more specific. [Probing for *specificity*.]
- Student** Well, I think we should be able to choose our own courses and teachers.
- Teacher** Why do you think that would solve the problem? [Probing for *support*.]
- Student** Because if students could choose their own courses and teachers they would be a lot happier in school, and then they wouldn't want to drop out.
- Teacher** Wouldn't students be unhappy if they chose their own courses and teachers, but didn't like the courses or teachers they had chosen after classes had started? [Probing for *complexity*.]
- Student** Yes, but that would be their own fault not someone else's. The problem is that students don't have any choices, and they resent someone telling them what to do every minute.

Note that the preceding dialogue could have negative or positive outcomes depending on the attitude of the teacher and the student involved. It is important to ask probing questions in a cooperative sense. Students should feel that you are asking them to support their statements because you want to know what they have to say, not that you are challenging them for giving a poor answer. Probing questions should expand the dialogue, not shut it off.

Sometimes other students will become impatient with a classmate who is slow to develop an answer and will attempt to answer probes that are intended for him. Because the purpose of probing is to develop an individual student's ability to support his answer, you should, insofar as possible, defer other students' reactions and concentrate on helping the student who gave the initial response. Ask several probing questions if you can do so without embarrassing the student or losing the group's interest in the discussion.

One problem is deciding when to redirect a question to give another student a chance to answer and when to ask a probing question to help develop a single student's thought. It is hard to give a formula for when to do which. Use your own judgment in determining which is more important at that moment. Probing a single student's idea has value as a model. Often other students' answers improve after a teacher has taken the time to develop a good answer from a single student. Eventually, you want students to internalize the probing process: to evaluate their own answers, ask themselves probing questions, and improve their ability to think critically.

Another problem is that probing questions can sometimes take a discussion "off base." One answer will generate an unexpected idea that you want to explore. You must decide whether to continue asking the questions you have planned or to consider new ideas. Try to allow for spontaneity while still keeping the discussion in focus.

A word of caution is appropriate here. Do not expect brilliant answers to your questions. Also, do not expect students to respond immediately. Give them time to think. If students are not accustomed to answering higher cognitive questions, it will take time before they become comfortable in their new role. It may also take time before you are satisfied with your role in a discussion lesson. One teacher who took this Mini-course commented, "I have difficulty when the answers are good and supported but not what I want. I end up giving out the answer myself." With practice, you can overcome this feeling of wanting a prescribed answer; instead, you can look forward to hearing what students come up with, especially if it is unexpected.

Also, do not expect dramatic improvement in your students' ability to answer higher cognitive questions during the time you take this Mini-course. However, substantial gains should come if students are asked higher cognitive questions over the span of a year's work in school, particularly if they are asked such questions in several different subjects.

Educational Objective

Probing questions help a student give a better response to higher cognitive questions. Probing for support helps a student give reasons or examples in support of his statement.

Teacher Ability

If the teacher is not satisfied with a student's answer, he asks a probing question or a series of probing questions that require the student to develop his answer further.

Student Activity

In answering a probing question, the student elaborates on his initial response. In doing so, he begins to develop standards about what a good answer is. In answering a probe for support, the student gives reasons, facts, or examples to justify his opinion.

HINTS ON ASKING QUESTIONS THAT PROBE FOR SUPPORT

It is difficult to write out probing questions beforehand. Their occurrence and wording depends on the student responses that are given in the context of a particular discussion. However, here are some probing questions that teachers use frequently:

1. *Why?*
2. *Why do you think that?*
3. *Why do you believe that will happen?*
4. *Can you give us a concrete example?*
5. *How would you illustrate your point?*
6. *How would that solve the problem?*
7. *How did you decide that?*

Exercises

The following dialogue was taken from the transcript of an eighth grade class discussing Tennyson's poem, "The Charge of the Light Brigade." The poem is printed below for reference. Throughout the discussion there are places where the teacher could have probed for support. When you come to a blank space, write in a probing question you think the teacher could ask.

The Charge of the Light Brigade²

Half a league, half a league,
 Half a league, onward,
 All in the valley of Death
 Rode the six hundred.
 "Forward the Light Brigade!
 Charge for the guns!" he said.
 Into the valley of Death
 Rode the six hundred.

"Forward, the Light Brigade!"
 Was there a man dismayed?
 Not though the soldier knew
 Someone had blundered.
 Theirs not to make reply,
 Theirs not to reason why,
 Theirs but to do and die.
 Into the valley of Death
 Rode the six hundred.

²This poem refers to a famous charge of the British Light Cavalry under Lord Cardigan at Balaclava near Sebastopol, on September 26, 1854, during the Crimean War. Through an error in orders, the troop was ordered to charge against the entire Russian army of twelve thousand, supported by artillery; of 673 officers and men who participated, 247 were either killed or wounded.

Cannon to right of them,
 Cannon to left of them,
 Cannon in front of them
 Volleyed and thundered;
 Stormed at with shot and shell,
 Boldly they rode and well,
 Into the jaws of Death,
 Into the mouth of hell
 Rode the six hundred.

Flashed all their sabers bare,
 Flashed as they turned in air,
 Sabering the gunners there,
 Charging an army, while
 All the world wondered.
 Plunged in the battery smoke
 Right through the line they broke;
 Cossack and Russian
 Reeled from the saber stroke
 Shattered and sundered.
 Then they rode back, but not,
 Not the six hundred.

Cannon to right of them,
 Cannon to left of them,
 Cannon behind them
 Volleyed and thundered;
 Stormed at with shot and shell,
 While horse and hero fell,
 They that had fought so well
 Came through the jaws of Death,
 Back from the mouth of hell,
 All that was left of them,
 Left of six hundred.

When can their glory fade?
 O the wild charge they made!
 All the world wondered.
 Honor the charge they made!
 Honor the Light Brigade,
 Noble six hundred!

—Alfred Lord Tennyson (1854)

Dialogue

Teacher We're going to talk about the poem we've just read, "The Charge of the Light Brigade." The first question is this: What was the actual order given to the Light Brigade?

Donna Charge . . . Charge for the guns.

Teacher What was the result of the order?

Lewis Death.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *Why?*

Can you explain your answer further?

Now please continue reading the dialogue.

Dialogue

Teacher Can you explain your answer further? [Probing for support.]

Lewis Well, they had to ride down into this valley with people on the left and right. And all they had were swords. And the others had cannons and rifles.

Teacher All right. Which lines in the poem tell us about the soldiers' duty?

Donna In the second stanza it says, "Theirs not to make reply,/Theirs not to reason why,/Theirs but to do and die./Into the valley of Death/Rode the six hundred."

Teacher Do you think a soldier should be able to choose whether or not to follow an order?

Bill No.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *Why do you say, No, Bill?*
Why not?

Now please continue reading the dialogue.

Dialogue

Teacher Why do you say *No*, Bill? [Probing for support.]

Bill A soldier can't judge for himself. He has to do what they say.

Teacher Why? [Probing for additional support.]

Bill The order could be part of a plan. A soldier can't know what the officer has in mind. He has to do what they say.

Donna But it was a mistake.

Teacher Let's talk about that. There is evidence in the poem that the officer did make a mistake. In the face of that, do you think the soldiers should have followed orders?

Lewis It doesn't matter what they do.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *Why do you say that, Lewis?*

Why doesn't it?

Why?

Now please continue reading the dialogue.

Dialogue

Teacher Why do you say that, Lewis? [Probing for support]

Lewis You can't really do anything if you're a soldier. If you don't go, you get court-martialed and maybe hanged. If you do go, you have maybe a one-in-a-million chance of living.

Donna I don't think a soldier should have to obey an order if he knows it's a mistake.

Bill But he can't know whether or not an order is a mistake. He doesn't know the battle plan or the situation.

Teacher We have a difference of opinion here. Let's see what the poet's attitude is. A good poet will create a mood or feeling in the reader toward the poem. I'd like someone to read this poem aloud and tell what mood you think Tennyson was trying to create. Okay, Chris.

Chris [Reads the first stanza aloud.]

Teacher What kind of a mood does this create?

Chris Well, an exciting mood.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *How does it create this mood?*
What do you mean by exciting?
Why do you say that?

Now please continue reading the dialogue.

Dialogue

Teacher How does it create this mood? [Probing for support.]

Chris Well, he's building up to a climax, while they're charging and everything.

Donna Sounds like he's trying to get everything in there. It's got a lot of action in it and a lot of spirit and life.

Teacher "Half a league, half a league,/Half a league, onward/
All in the valley of Death/Rode the six hundred." Do you feel they're going to their death?

Lewis No, you feel kind of the opposite.

Teacher I have a difficult question for you. Do you think the poem embellishes heroism in war? Or does it degrade war by showing how many lives were lost for a foolish reason? Bill?

Bill What does embellish mean?

Teacher Elaborate, make greater. Does this poem make heroes out of the six hundred?

Bill I think it's kind of both.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *Why do you think it's both?*
Why?

Now please continue reading the dialogue.

Dialogue

Teacher Why do you think it's both? [Probing for support.]

Bill Well, it's mostly degrading, but there's a little embellishing, too.

Exercise

Please write in a probe for *support* that you might ask here.

Teacher _____

Now turn the page.

Answer

We would ask one of the following questions to probe for support:

Teacher *Can you explain that more?*

Why? What in the poem makes you say that?

Now please continue reading the dialogue.

Dialogue

Teacher Can you explain that more? [Probing for support.]

Bill Well, it starts out like they're doing something good. And they go in there, and then it's kind of degraded when they get in there and get slaughtered. That kinda wrecks the whole thing right there.

Teacher "Half a league, half a league,/Half a league, onward . . . Theirs not to reason why,/Theirs but to do and die." Does this argue for or against the charge?

Donna It's neither one. It's just telling what happens when you go to war.

Teacher These are good answers. You're doing a good job of supporting what you say.

**MODEL LESSON IMPROVING THE QUALITY
OF STUDENT ANSWERS**

This is a transcript of a classroom lesson similar to those in the films. We included this lesson in handbook form so you can study it carefully and at your own pace. The lesson is to help you develop a sensitivity to question types and student responses.

As you read the transcript, classify the questions that are marked. Circle the appropriate category among the choices offered below the question, then check your answer on the following page and continue reading the transcript. The category *other* refers to higher cognitive questions you will study.

For your information, the question type is identified in parentheses.

This group () is discussing friendship.

Teacher You know we've all talked about making and keeping friends and how important it is. Let's talk about friends for just a few minutes. What does the word *friend* mean?

Circle one *Knowledge* *Comprehension* *Other*

Now turn the page to check your answer.

Knowledge. This question requires students to supply a definition.

Student 1 It has to do with someone that likes you a lot and likes to play with you.

Teacher All right. Elaine?

Student 2 Somebody who you can trust and who would go and get your math book when you're sick or something so you won't have to do a whole bunch of homework the next day.

Teacher Can you describe some of the other things that a good friend does?

Circle one: *Comprehension* *Probing* *Knowledge*

Turn the page to check your answer.

Comprehension. This question requires students to give a description in their own words.

Student 1 He picks up your homework for you when you're sick.

Student 2 He invites you over to stay overnight and have dinner or something.

Student 3 Sometimes he'd be sharing toys with you, or he may come over and try to comfort you when you're sick.

Teacher All right. Those are good ideas. Elaine, do you have another idea?

Student 4 Well, when you forget your lunch and he shares his sandwich or lets you have one of his Sohos or something.

Teacher How important is it to you to have a good friend?

Circle one *Other* *Knowledge* *Comprehension*

Turn the page to check your answer.

Other. (evaluation). This is a higher cognitive question that asks students to make a value judgment.

Student 1 It's important because if you don't have a friend then you don't have anybody to play with, and you don't have anybody who likes you.

Teacher All right. Bob?

Student 2 If you didn't have a friend sometimes you might get real lonely.

Teacher
(to student 2) Why would that be?

Circle one *Probing* *Knowledge* *Comprehension*

Turn the page to check your answer.

Probing. This question requires a student to explain his answer further.

Student 2 Well, you won't have nothing to do, just sitting around being real bored.

Teacher All right. Elaine?

Student 3 Well, if you don't have a friend then you'll just have to go without a lunch, and then you'll have to get lunch from home the next day.

Teacher Let's think of something else. Some people have trouble making friends, right?

Student 2 Right.

Teacher Why do you think that some people have trouble making friends?

Circle one *Knowledge* *Comprehension* *Other*

Turn the page to check your answer.

Other (analysis). This is a higher cognitive question that asks students to identify causes or motives.

Student 1 Because they don't know anyone that would like to be friends with them.

Teacher
(to student 1) All right. Now, why? Why would this happen?

Circle one *Knowledge* *Comprehension* *Probing*

Turn the page to check your answer.

Probing. This question requires a student to give the rationale behind his answer.

Student 1 Because people just wouldn't feel like playing with that person, and they would feel like playing with another person or somebody else.

Teacher Jim?

Student 2 They just don't have what it takes to make friends.

Teacher
(to student 2) Now, what do you mean, has what it takes?

Circle one *Knowledge* *Comprehension* *Probing*

Turn the page to check your answer.

Probing. Again the question requires a student to explain his answer further.

Student 2 They just don't know how to make friends. They don't like to do what you mostly have to do with a friend.

Teacher Elaine?

Student 3 Some people who have trouble making friends, they just aren't friends themselves. They're not good friends.

Teacher That's important. Bob?

Student 4 They have trouble making friends because they always want their way, and they're being so nasty about things.

Teacher Well, now, what can you do to make friends with others?

Circle one *Comprehension* *Other* *Knowledge*

Turn the page to check your answer.

Other (synthesis). This is a higher cognitive question that asks students to suggest ways to solve a problem.

Teacher Elaine?

Student 1 Well, you could maybe say, "Well, come over to my house and we'll play some games." And then you ask, "What game do you want to play?" And then you'll say, maybe, "Password," and so then you'll play it. Or you just play games that he wants to play.

Teacher How about some other ideas on this? Julie?

Student 2 Forgot what I was going to say.

Teacher Well, that happens. We were talking about what you can do to become good friends with others. Now, what can you do? You think about it for a minute. Bob?

Student 3 You can share and share alike.

**Student
(to student 3)** That's a good idea. Now, how would you do this, for example? How would you share and share alike?

Circle one *Probing* *Comprehension* *Knowledge*

Turn the page to check your answer.

Probing. This question requires a student to give an example to support his idea.

Student 3 You could share toys, or you both have things you'd like to share together. Say you have one toy and your friend has another toy, you could use your friend's toy for a while and your friend could use your toy. And then you might have some other toys and it would go the same way.

Teacher Okay, now. Really think about this. How are boyfriends different from girlfriends?

Circle one

Comprehension

Other

Knowledge

Turn the page to check your answer.

Comprehension. This question requires students to make comparisons.

Teacher Jim? What do you think?

Student 1 Well . . . I don't know.

Teacher You don't know about that one. Elaine?

Student 2 Well, girls usually most of them don't like to play with things. Like boys play ball, baseball and stuff like that, because they are interested in sports. Girls, they kind of like to do cartwheels and maybe clap hands together or something, or talk.

Student 3 Boys, sometimes they interfere with the girls and they don't like what they do, so they go on to another place. And sometimes the girls don't like what the boys are doing and the girls just go on somewhere else.

Teacher Are you two saying that it's easy for boys to be friends and for girls to be friends, but it's hard for boys and girls to be friends?

Student 4 I think it's hard.

Teacher What makes it hard?
(to student 4)

Circle one

Knowledge

Probing

Comprehension

Turn the page to check your answer,

Probing. This question requires the student to give reasons for her answer.

Student 4 Because boys and girls aren't interested in doing the same things.

Teacher Do you think it's important in the fourth grade to have both boyfriends and girlfriends?

Turn the page to check your answer.

Other (evaluation). Again, this question requires students to make a value judgment.

Student 1 Well, maybe. You could do different things with different friends. Like I sometimes like to play baseball instead of jump rope.

Student 3 I think it's good to have both boyfriends and girlfriends so when you're doing math, or when we work in our social studies groups, you have lots of people to help you.

You are now ready to prepare your microteach lesson. Microteach instructions are on the next page.

INSTRUCTIONS FOR MICROTEACHING (1)

Purpose

(K)

(C)

(AP)

To practice *asking knowledge, comprehension & application type questions* microteaching procedures, and asking probing questions to improve student answers on the criterion of support.

Before You Microteach

1. Choose a lesson topic.
2. Plan questions on the topic and write them on the Microteach Form.
3. Teach your microteach lesson.

After You Microteach

Write the of

1. *Replay* your microteach tape with the Microteach Form by your side.
2. *Concentrate whenever* you ask a question. If it is *an unplanned* knowledge, comprehension, or application question, make a tally mark in Box C of the Microteach Form. If it is a higher cognitive question you had not planned, make a tally in Box B. If it is one of your planned *K, C or AP* questions, make a tally in Box A and prepare to analyze it further.
- 3a. If the question was planned, observe carefully the students' answers and your follow-up responses.
Fill in appropriate columns of Box A. There are columns for evaluating as many as four student responses to each planned question.
- 3b. In Box A, the row labeled "Criterion" enables you to evaluate each student response on the criterion of support (or another criterion, if you wish). If you think a student supported his answer with evidence or reasons, write in "Y" for "Yes." Note a partially supported answer by "P," and if the answer was not supported at all, note it by "N" or "No."
- 3c. After each student answer, observe the tape to determine whether you attempted to improve it by asking a probing question. If so, make a tally in the row labeled "Probes."

Note: You need only follow steps 3a, 3b, and 3c if you asked a *planned* question. Otherwise, a tally in Box B or Box C is sufficient. Also, make additional comments on the forms as you wish. For example, you may wish to jot down good questions that arise spontaneously, so you can use them again, perhaps in the reteach lesson. You may also want to note whether students' answers improve after you ask a probing question.

Procedures for Reteaching

1. Vary the lesson by (1) revising your questions ^{*or perhaps*} (2) choosing a new topic,
2. Evaluate your tape, using the same procedure you used for the microteach lesson.

FORM 4. MICROTEACH FORM

(1)

Question type K, C, or AP	BOX A. Planned Questions		Student Responses			
			1	2	3	4
1.		Criterion				
		Probes				
2.		Criterion				
		Probes				
3.		Criterion				
		Probes				
4.		Criterion				
		Probes				
5.		Criterion				
		Probes				
6.		Criterion				
		Probes				
7.		Criterion				
		Probes				
8.		Criterion				
		Probes				
9.		Criterion				
		Probes				
10.		Criterion				
		Probes				
	11. (etc)					

BOX B.	Higher Cognitive Questions
Tally	

BOX C.	<i>Knowledge, Comprehension, Application Questions (unplanned)</i>
Tally	

Summary

1. Observations:

FORM 5. RETEACH FORM

Check the microteach instructions

Question Type K.C. or AP	BOX A. Planned Questions		Student Responses			
			1	2	3	4
1.		Criterion				
		Probes				
2.		Criterion				
		Probes				
3.		Criterion				
		Probes				
4.		Criterion				
		Probes				
5.		Criterion				
		Probes				
6.		Criterion				
		Probes				
7.		Criterion				
		Probes				
8.		Criterion				
		Probes				
9.		Criterion				
		Probes				
10.		Criterion				
		Probes				
11.						

BOX B.	Higher Cognitive Questions
Tally	
BOX C.	<i>Knowledge, Comprehension, Application Questions (unplanned)</i>

Summary

1. Observations

ANALYSIS QUESTIONS

The ability to analyze is an important aspect of critical thinking. It follows that a teacher who uses *analysis* questions is helping students develop important thinking skills.

Analysis

A question should be regarded as an analysis question if:

the pupil is required to break down the material into its constituent parts, to detect the relationship of the parts and the way they are organized.

Although not intended to include all possible varieties of analysis questions, the following should be regarded as analysis:

e.g. i) The pupil is asked to establish relationships he had not previously realized, to explain relationships by identifying motives or causes.

T: Why do children spend much of their playtime imagining things and living in fantasies?

or T: How did the minister's statement result in this action by the parents?

or T: What is common to all those problems?

ii) the pupil is asked to make inferences based on given material.

T: What does this poem tell us about the poet's own house?

or T: Now that we have watched our "mini-garden" for three months, what can we say about the needs of plants?

iii) the pupil is required to find evidence to support generalizations.

T: What evidence does our experiment provide that the metal is copper?

or T: Could you suggest why this writer believes a population crisis in the world to be highly probable within the next 50 years?

Teacher Activity

In composing *analysis* questions, the teacher (1) identifies relevant actions or events and then asks students to explain why they occurred; (2) selects a poem, story, chapter, or document and asks students to analyze it in order to arrive at inferences, generalizations, or interpretations; and (3) identifies an inference, generalization, or interpretation and asks the students to analyze the lesson materials to find supporting evidence.

Student Activity

In answering *analysis* questions, a student will learn (1) to establish relationships he had not previously realized; (2) to develop his own generalizations, inferences, and interpretations; and (3) to distinguish between generalizations and the facts that support them.

HINTS ON ASKING ANALYSIS QUESTIONS

Many *analysis* questions are easily recognized by their stems:

1. *Why* (did Huck Finn decide not to report Jim as a runaway slave)?
2. *Now that we've studied this, what can we conclude about* (life in Aztec society)?
3. *What does this tell us about* (the author's feeling about children)?
4. *What evidence can you find to support* (the principle that hot air rises)?

USING PROBING WITH ANALYSIS QUESTIONS

Students often give brief answers to *analysis* questions of the *why* type. You will need to probe for support to uncover the rationale behind a student's answer. Additionally, in answering the other two types of *analysis* questions, students will generally volunteer only one or two generalizations or a single piece of supporting data. Staying with a question and probing for additional support helps students learn to give good answers.

EXERCISES

Please study the following poster:

Farms and Homes in Kansas
EMIGRANTS

Look to your
INTEREST

Farms at \$3. Per Acre!

And Not a Foot of Waste Land.

And on Purchase No Portion of the Principal Required!!

LANDS NOT TAXABLE FOR SIX YEARS!

FARMING LANDS IN
EASTERN KANSAS.

The Central Branch

UNION PACIFIC RAILROAD CO.,

Offer for Sale Their Lands in the Celebrated

KICKAPOO INDIAN RESERVATION

152,417 acres

Schools and Churches¹

Here are three *analysis* questions that can be asked after students have examined this poster:

1. Why do you think the railroad company was offering such a good deal to the emigrants?
[Students draw on their knowledge of socioeconomic conditions of that era and show how they might be related to this poster; also, students can *imagine* conditions that might have existed.]
2. When do you think this was written?
[If students only recall a fact, then this is a *knowledge* question. if students draw on their knowledge of different historical conditions and relate these to clues given in the poster, then it is an *analysis* question.]
3. What does this poster tell you about the Midwest in the 1870's?
[Students are asked to make inferences from available data in the poster.]

¹From *Social Study: Inquiry in Elementary Classrooms* by H. Millard Clements, William R. Fielder, and B. Robert Tabachnick. Indianapolis: Bobbs-Merrill Company, 1966 (p. 357).

Please study the following listing:

PIONEER FARMERS

These wagons were loaded with all kinds of goods. There was enough to last several weeks.

Food for One

Bacon—150 lbs.
Coffee—25 lbs.
Flour—15 lbs.
Sugar—25 lbs.
Salt
Pepper
Saleratus
(baking soda)
Beans and Rice
Vinegar &
spices

Utensils

2 Iron Kettles
Frying Pan
Coffee pot
Bake pan
Butcher knives
Knives, forks,
spoons, cups
Gutta-percha
bucket
Medicines
Matches
Soap
Spade, Ax, Hammer
Rifle and Revolver

Spare Parts

Chain Links
Doubletrees
& whippletrees
Ox Yoke
Harness parts
Horseshoes & Ox
shoes
Tar bucket of
grease
Rope
Nails
Buckskin
Ammunition
Trinkets for
Indians
(Mirrors,
Ribbons,
Tobacco, etc.)²

²From the revised edition of *Law in a New Land: A Casebook for Intermediate Grades*, Robert H. Ratchffe (ed.). Chicago: Law in American Society Foundation, 1969 (p. 93).

Below are a number of questions that a teacher might ask concerning this list of pioneer supplies. Use the following key to fill in the blanks:

K = *Knowledge*

C = *Comprehension*

AN = *Analysis*

1. What kinds of food did the pioneer farmers carry with them in their wagons? _____

[Student must recall items from the list.]

2. How does the food list compare to your diet? _____

[Student must compare something he has read with personal experience.]

3. Why do you think the pioneers carried vinegar and spices in their wagons? _____

[Teacher is asking student to infer motives.]

4. What can we conclude about the pioneers' diet from their list of food supplies? _____

[Student must make an inference based on specific information.]

5. Last week we were studying the fur traders. How do the pioneers' supplies compare with those available to the fur traders? _____

[Student must compare present topic with previously learned material.]

6. Why do you think the pioneers carried trinkets for the Indians? _____

[Student is asked to infer motives.]

7. What can we conclude from the fact that the pioneers carried rifles, revolvers, and ammunition in their wagons? _____

[Teacher wants student to draw inferences from specific data.]

8. What is *saleratus*?
[Student must recall a definition that is given in the passage.]
9. Why didn't the pioneers carry such things as fish, milk, eggs, and cheese in their wagons?
[Student must infer motives and causes.]

Turn the page to check your answers.

Answers

- | | |
|-------|-------|
| 1. K | 6. AN |
| 2. C | 7. AN |
| 3. AN | 8. K |
| 4. AN | 9. AN |
| 5. C | |

If you made an error, it will be helpful for you to reread the question and its objective

Please read the following passage:

CONSERVING OUR AIR

There is poison in the sky. This poison is *polluted air*. At times we can see it—a grayish smoke that hangs over the land, hiding the sun. We can also smell and feel it. Polluted air stings our noses, burns our eyes, and scratches at our throats and lungs.

After a while it seems to disappear, and our skies are once more clear. But it leaves its marks. Plants may be wilted, cattle and other livestock may be ill, plant leaves become coated with a glaze, crops such as lettuce, beans, and alfalfa are damaged, metal is corroded, stone and paint are eaten away, and people suffer with a lingering cough.

If the polluted air settles low over the ground, visibility is reduced and traffic hazards are produced for automobiles and airplanes. Doctors say that polluted air can aggravate heart and respiratory conditions.

Man is responsible for polluted air. Anything that pollutes the air is called a *pollutant*. The great number of industries created by man pour great amounts of pollutants into the sky each day. Fumes from steel mills, power plants, and petroleum and chemical plants often cover dozens of square miles with clouds of black smoke. Exhaust fumes from cars and trucks and buses add to the pollution in the sky. Even the burning of leaves in the backyard sends pollutants into the air.³

³From *Science: Measuring Things* by J. Darrell Barnard and Celia B. Lavatelli. New York: The Macmillan Company, 1970 (p. 274).

Answers

1. AN
2. K
3. C
4. K
5. AN
6. AN

If you made an error, it will be helpful for you to reread the question and its objective.

Please study the following poem:

I WAS BORN FORTY YEARS AGO

I was born forty years ago.
 I lived . . .
 a little girl with blowing hair.
 I grew . . .
 like a flower
 in that garden of security.
 I knew no fear
 in a world of five-per-cent security.
 How superficially beautiful it was!
 I married.
 I was happy.
 There was war.
 He went for king and country.
 He died for them.
 He died with the other millions.
 He left me with a son.
 That was all that was left of him.
 The boy grew up.
 There was war.
 He went for king and country.
 He went in the air.
 Like an eagle he went.
 They shot him down.
 And he died.
 You have seen things fall
 from a great height.
 That is how he died.
 Do you know who I am?
 I am the woman of forty.
 I am English.
 I am French . . . German . . .
 I am Russian . . .
 I am the woman of forty.
 My men are dead.⁴

Stuart Cloete

⁴Reprinted by permission of William Morris Agency, Inc. Copyright © . . . by Stuart Cloete

Compose questions you might ask your class about the material on the preceding page. Compose questions in each category listed.

Knowledge

1. _____

2. _____

Comprehension-

1. _____

2. _____

Analysis

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

You may wish to compare your questions with the ones we wrote:

Knowledge

1. Is the author of the poem a man or woman?
2. What does the word *superficially* mean?

Comprehension—Giving a Description

1. Describe the lady in this poem.

Comprehension—Comparing

1. What similarities were there in the life of her husband and the life of her son?

Analysis—Answering Why Questions

1. Why do you think the author wrote this poem?
2. Why do you think the poet said, “He went in the air,/Like an eagle he went.”?

Analysis—Making an Inference from Specifics

1. When do you think this poem was written?
2. After reading this poem, what do you think the poet’s attitude toward war is?

Analysis—Giving Evidence to Support a Generalization

1. The person in the poem seems sad rather than angry. What things in the poem suggest this?
2. What evidence in the poem suggests that it was written by a European?

Please read the following passage:

“TREATMENT LESS THAN FAIR”

Irish and German-Americans found that some rooming houses would not take them in. Even those who had the money could not buy homes in the better neighborhoods. Although some employers hired immigrants because they were cheap, others would not hire them at all. Advertisements for workers sometimes said, “Irish need not apply.” Some restaurants and other places of business posted signs saying Irish or Germans were not welcome.

As time passed, the situation of the Irish, German, and Scandinavian-Americans improved. The early immigrants became established citizens. Their children and grandchildren, though still identifiable, were native-born Americans. Reinforced by the postwar wave of immigration from their home countries, they became numerous enough and strong enough to battle successfully against discrimination.⁵

⁵From *Land of the Free* by John W. Caughey, John H. Franklin, and Ernest R. May. New York: Benziger, 1971 (pp. 417-418). Reprinted by permission of the authors.

Compose questions you might ask your class about the material on the preceding page. Compose questions in each category listed.

Knowledge

1. _____

Comprehension

1. _____

2. _____

Analysis -

1. _____

2. _____

.....
.....
.....

3.
.....
.....
.....

4.
.....
.....
.....

5.
.....
.....
.....

6.
.....
.....
.....

You may wish to compare your questions with the ones we wrote:

Knowledge

1. Why did some employers hire immigrants?
[Seemingly an *analysis* question, but notice that the answer was given in the passage.]

Comprehension

1. Describe the problems faced by Irish and German immigrants to America.
2. Compare the situations of first-generation and later-generation Irish and German immigrants.

Analysis—Answering Why Questions

1. Why do you think people are intolerant of newcomers?
2. Why would employers not want to hire immigrants?

Analysis - Making an Inference from Specifics

1. What does this passage tell us about what it was like to be a turn-of-the-century immigrant?
2. What can we conclude about Americans' attitude toward minority groups from this passage?

Analysis—Giving Evidence to Support a Generalization

1. The title of the passage is "Treatment Less than Fair." What evidence can you find to support this statement?
2. How do the facts in this passage support the idea that acceptance into a culture is usually accomplished only after a long struggle?

MODEL LESSON ANALYSIS QUESTIONS

This model lesson is a transcript of an actual classroom lesson. As you read the transcript, classify the questions that are marked. Circle the appropriate category among the choices offered, then check your answer on the following page and continue reading the transcript.

The following discussion occurred in a fifth grade class:

Teacher We've just completed reading *Tom Sawyer* by Mark Twain. What are the names of the main characters?

Circle one *Knowledge* *Comprehension* *Analysis*

Turn the page to check your answer.

Knowledge. This question requires a student to recall facts from the book.

Student 1 Huck Finn.

Student 2 Tom Sawyer.

Student 3 Becky Thatcher.

Teacher The second chapter is called "The Glorious White-washer." Why do you think it's called this?

Circle one *Analysis* *Comprehension* *Knowledge*

Turn the page to check your answer.

Analysis. This question requires students to infer a cause or motive.

Student 1 Because Tom tricks people and gets away with it.

Student 2 See, he had to whitewash the fence, and he tricked other people to do it. Like his friend, he always said, "Ha, ha, you have to do it." And then he tricked his friend into doing it.

Student 3 He got his friend to say, "I'll give you this, I'll give you that, but let me paint."

Teacher Let's turn to page 15. Mark Twain says that "work consists of whatever a body is obliged to do, and play consists of whatever a body is not obliged to do." Can you tell me in your own words what this means?

Circle one *Analysis* *Comprehension* *Knowledge*

Turn the page to check your answer.

Comprehension. This question requires students to use their own words to describe what they have read.

Student 1 Play is not what you have to do, but work is.

Teacher Can someone explain that further?

Student 2 Like if you want to do work, it's not really work. But if you have to do it, then it's work.

Student 3 If you have to do something, it's hard; it seems hard. But if you don't have to and you're going to do it anyway, it seems real fun and everything.

Teacher Why did Ben want to whitewash the fence so much when in the beginning he made fun of Tom for doing it?

Circle one: *Knowledge* *Analysis* *Comprehension*

Turn the page to check your answer.

Analysis. This question requires students to infer personal motives.

Student 1 Because Tom made it look fun. He kept saying it was fun and everything, so then Ben wanted to do it.

Student 2 Tom wouldn't let him do it. At first he wouldn't let him do it, so he wanted to do it more and more.

Student 3 Tom kept saying no till he finally decided this is the right time to say yes because Ben was really anxious to do it.

Teacher Please turn to page 5. Mark Twain says that Tom Sawyer was not the model boy of the village. Can you think of some things that Tom did that would support that statement?

Circle one *Analysis* *Comprehension* *Knowledge*

Turn the page to check your answer.

Analysis. This question requires students to cite specific examples to support a generalization.

Student 1 He was really mischievous.

Teacher In what way? [Probing question.]
(to Student 1)

Student 1 Like he played hookey from school, and he was able to trick lots of people into doing what had to be done.

Student 2 A lot of other kids don't play hookey from school, but he had to be different.

Student 3 He made everyone think he was dead, and then he walked in on his own funeral.

Teacher Those were very good answers. Now let's turn to page 2. Let's take a look at one incident involving Tom. His Aunt Polly is about to hit him with a switch for eating jam and then hiding from her. Stuart, would you read the part that begins "The switch . . .?"

Stuart "The switch hovered in the air, the situation was desperate. 'My, look behind you, Aunt!' The old lady whirled around and snatched her skirts out of danger. The lad fled on the instant, scrambled up the high board fence and disappeared over it."

Teacher What kind of person is Tom?

Circle one *Knowledge* *Comprehension* *Analysis*

Turn the page to check your answer.

Analysis. This question requires students to use specifics to build a generalization about Tom Sawyer's character.

Student 1 A sneaky one.

Teacher In what way? [Probing question.]
(to Student 1)

Student 1 He tricked his aunt. First he tricked her into coming out in the open, out the door. Then he told her to look around.

Student 2 He's tricky.

Teacher How? [Probing question.]
(to Student 2)

Student 2 He can run away from danger.

Student 3 Sly.

Student 4 He's bad; he shouldn't do that.

Teacher Have you ever read about anyone else or perhaps know someone who is like Tom?

Circle one *Knowledge* *Comprehension* *Analysis*

Turn the page to check your answer.

Comprehension. This question requires students to compare and contrast Tom Sawyer's character with that of their friends and acquaintances.

Student 1 My brother.

Teacher What does your brother do that is like Tom Sawyer?
(to Student 1) [Probing question.]

Student 1 He always picks on me.

Student 2 My girlfriend, because she always plays hookey.

Student 3 My sister, because she always gets me in trouble. She wrote on my wall one time with pencil and another time with color crayons, and I got the blame for it.

This concludes Model Lesson You are now ready to prepare your microteach lesson.

INSTRUCTIONS FOR MICROTEACHING (2)

Purpose

To practice asking *analysis* questions and to continue asking probing questions to improve student answers on the criterion of support.

Before You Microteach

1. Choose a lesson topic appropriate for *analysis* questions.
2. Plan *analysis questions*,
, and write them on the Microteach Form. (Please remember that these instructions are meant to be guidelines. You *will* need to plan other questions to ensure discussion continuity. You may not ask *all* the questions you plan. We realize that a discussion with *six analysis* questions is not necessarily better than one with *four analysis* questions,
3. Teach your microteach lesson.

After You Microteach

1. Follow the same procedure for evaluating your microteach tape that you used *before*.

Procedures for Reteaching

1. Vary the lesson by (1) revising your questions, ^{or perhaps,} (2) choosing a new topic, or (3) choosing a different group of students.
2. Evaluate your tape, using the same procedure you used for the microteach lesson.

FORM 6. MICROTEACH FORM

(2)

BOX A. Planned Questions		Student Responses			
		1	2	3	4
Analysis Questions,					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3.	Criterion				
	Probes				
4	Criterion				
	Probes				
5.	Criterion				
	Probes				
6	Criterion				
	Probes				

7. et. | | | | |

BOX B.	Unplanned Higher Cognitive Questions
Tally	
BOX C.	<i>Knowledge, Comprehension, Application Questions</i>
Tally	

Summary**f. Observations:**

FORM 7. RETEACH FORM

(2)

BOX A. Planned Questions		Student Responses			
		1	2	3	4
Analysis Questions					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3	Criterion				
	Probes				
4.	Criterion				
	Probes				
5.	Criterion				
	Probes				
6.	Criterion				
	Probes				

7.

BOX B.	Unplanned Higher Cognitive Questions
Tally	
BOX C.	<i>Knowledge, Comprehension, Application Questions</i>
Tally	

Summary**4 Observations:**

SYNTHESIS QUESTIONS

Although students may give imaginative answers to other types of questions, *synthesis* questions require students to "put things together" in a way that is uniquely their own.

Students have relatively wide freedom to select approach and content. This does not mean that *synthesis* questions encourage wild guessing; rather, they stimulate independent thinking and creative speculation within limits set by the teacher.

Educational Objective

Teachers ask *synthesis* questions to stimulate their students' creative potential. By asking these questions, the teacher encourages personal expression and independent thinking. Students become productive rather than passive learners.

Synthesis

A question should be regarded as a synthesis question:

(a) when the pupil is intended to draw upon elements from many sources and to put these together into a structure or pattern not clearly there before - a product will result.

Although not intended to include all possible varieties of synthesis questions, the following should be regarded as synthesis.

e.g. i) the pupil is asked to make a prediction from the consideration of all the evidence at his disposal.

T: What changes in Education policy would occur if there were a change in government?

or T: What hypotheses can we generate from this data?

ii) the pupil is asked for an original solution to a problem.

T: How could we overcome the shortage of water?

or T: What actions should be taken to counter unemployment in Stirling?

iii) the pupil is asked to produce an original communication.

T: What does it mean to France to be surrounded so much by water?

or T: What would you say to the public to encourage their support for your plan?

(b) when the pupil is asked to adopt a position or stand regarding an issue or makes a judgement.

This type of question would involve two steps

- the setting up of standards or value structures, and

- the determination of how closely the idea or objects meet those standards or values.

e.g. T: Give me a reasoned argument to support the contention that "The rich get rich and the poor get poorer".

Classify these questions, using the following key:

K = *Knowledge*

C = *Comprehension*

AN = *Analysis*

1. The author of this passage says that there is poison in the sky. What evidence is there to support that statement? _____
[Student must find evidence to support a generalization.]
2. What is a pollutant? _____
[Student must remember a definition that is given in the text.]
3. Describe how you can tell if the air is polluted. _____
[Student must describe in his own words information given in the text.]
4. Who is responsible for polluted air? _____
[Student must repeat an explanation given in the text.]
5. Why do you think people allow the air to become polluted? _____
[Student must think of an explanation not given in the text.]
6. Man pollutes the air in many different ways. What does this tell us about how to control air pollution? _____
[Student must make an inference based on what he has read.]

Turn the page to check your answers.

Teacher Activity

When using *synthesis* questions, teachers must allow freedom for divergent answers. We suggest that you tell students that these questions have many good answers, not just one, and when they answer they should stretch their minds and not be afraid to be original.

In writing a *synthesis* question, use these guidelines:

1. Ask questions that involve familiar people, places, or things. A student cannot write a letter pretending he was an American colonist unless he is familiar with the historical period.
2. Give students enough information to help them form a clear idea of the problem to be solved, but not so much information that the answer seems apparent or predetermined.
3. Generally it is best to ask students to make predictions about the future, particularly their future, rather than deal with historical questions such as "What do you predict would have happened if Abraham Lincoln had not been assassinated?" Unless they have recently studied this part of American history, most students do not have enough information to answer this question.

Student Activity

In answering a *synthesis* question, a student will create or discover ideas that are new to him (although not necessarily new to society). The student will draw information from past lessons and personal experiences and use those sources to create a new pattern of ideas.

HINTS ON ASKING SYNTHESIS QUESTIONS

In writing *synthesis* questions, use these common stems:

1. *Can you think up* (a title for this story)?
2. *How can we solve* (this dilemma)?
3. *How can we improve* (our experiment)?
4. *What will happen* (now that we have landed on the moon)?
5. *What do you predict would happen* (if this lake were to run dry)?

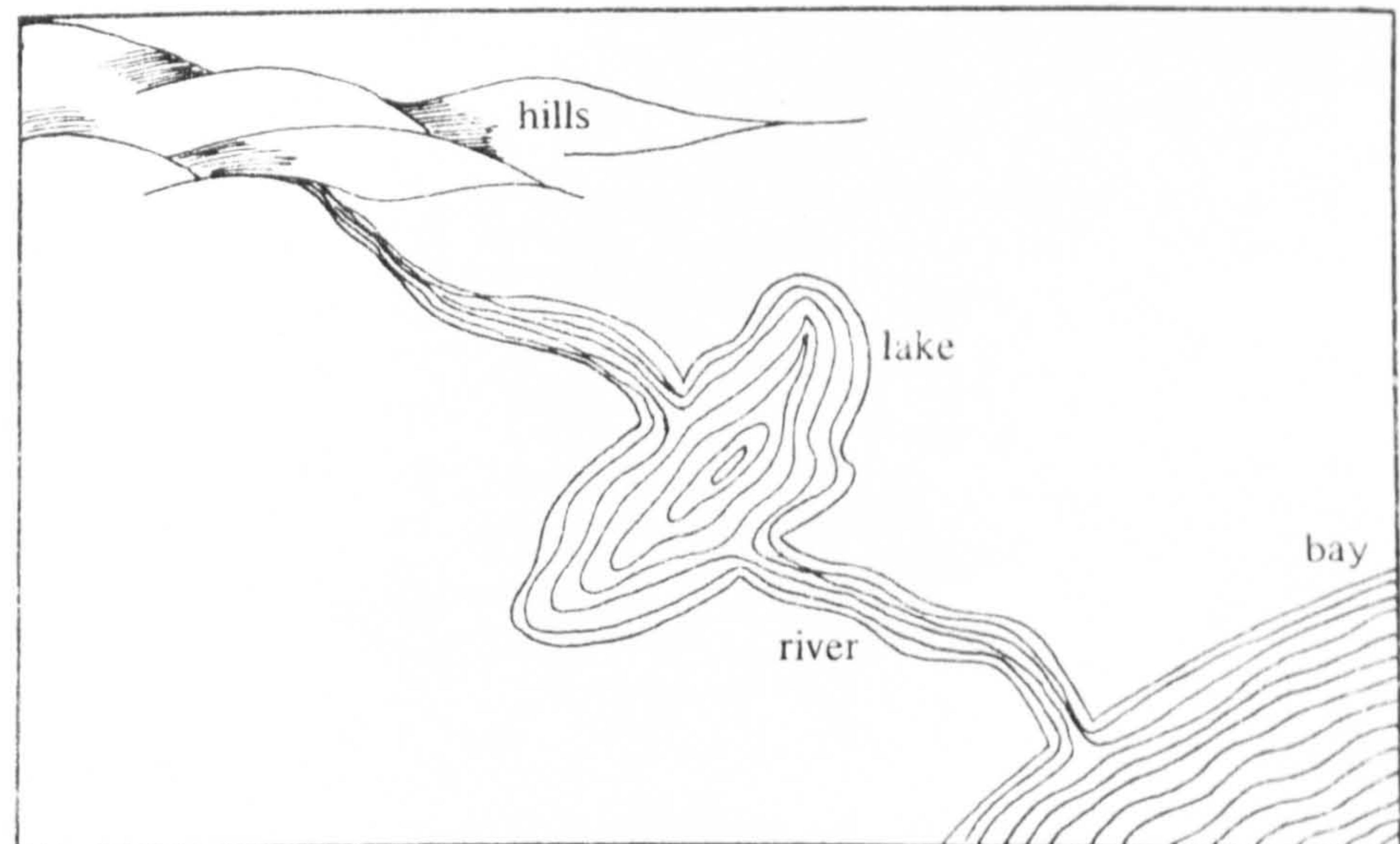
USING PROBING WITH SYNTHESIS QUESTIONS

Probing is a good technique to use with *synthesis* questions. By probing for support, you can help students complete their ideas. Be careful, however, not to take students' ideas away from them. Finishing ideas for them instead of letting them say it for themselves is a common fault among enthusiastic, well-meaning teachers. Try to avoid this in your microteach lessons.

The criterion of originality is particularly relevant to *synthesis* questions. In your microteach lesson, try to probe for originality as well as support.

EXERCISES

Please study the following map:



Below are four *synthesis* questions a teacher might ask his class about the map.

You are a city planner.

1. Where would you locate heavy industry on the map? [Problem-solving.]
2. Where would you locate recreational facilities? Why? [Problem-solving and probing.]
3. If you put recreation and heavy industry both along the river bank, what do you predict will happen? [Prediction.]
4. You are a public relations man for an oil company. Write an ad that will challenge the conservationists' contention that you are polluting recreational waters. [Production of an original communication.]

Please read the following poem:

**ONE, TWO, THREE—GOUGH!
1 2 3 GO**

To make some bread you must have dough
Isn't that sough?
If the sky is clear all through,
Is the color of it blough?
When is the time to put your hand to the plough?
Nough?
The handle on the pump near the trough
Nearly fell ough.
Bullies sound rough and tough enough,
But you can call their blough.¹

Eve Merriam

Below are a number of questions a teacher might ask his class about this poem. Use the following key to fill in the blank spaces:

K = Knowledge

C = Comprehension

A = Application

AN = Analysis

S = Synthesis

Remember to read the objective before you classify the question.

1. What do the last words in each line of the poem have in common?
[Student must compare.] _____
2. Why did the author misspell words?
[Student must explain the author's motive.] _____
3. What is a *trough*?
[Student must define a word.] _____

¹Copyright © 1964 by Eve Merriam. From *It Doesn't Always Have to Rhyme*. Used by permission of Atheneum Publishers.

4. What type of poem is this? _____
[Teacher wants student to apply his knowledge of technical terms.]
5. What other examples from the English language illustrate the author's main point? _____
[Student must give examples which support an idea.]
6. Select some of the examples given by classmates (or think of some new examples) and use them to write a poem. _____
[Student must create an original communication.]
7. If you were teaching English to a foreigner, how would you teach him to spell and pronounce words like dough, so and through, blue? _____
[Student is asked to solve a problem.]
8. From reading this poem, what do you think is the poet's attitude toward English spelling and pronunciation? _____
[Teacher wants the student to make an inference.]

Turn the page to check your answers.

Answers

- | | |
|-------|-------|
| 1. C | 5. AN |
| 2. AN | 6. S |
| 3. K | 7. S |
| 4. A | 8. AN |

If you made an error, it will be helpful for you to reread the question and its objective.

Please read the following excerpt:

ADAPTATION

Living things that have the best chance of ultimate survival are those that are very adaptable. Those that become too restricted to one food source or to a certain limited environment can have trouble existing.

Introduction to a different but favorable environment can usually be successful. For example, rubber trees from Brazil grow in Indonesia and Malaysia. Eucalyptus trees from Australia adapt very well to growing in California. Other living things do not always do as well. The camel which originated in North America died out on this continent. Attempts to introduce this animal later were not very successful. However, it succeeded very well in the Middle East. ²

²From *Population Patterns of Living Things* by Donald Lundstrom. Newport Beach, California: Franklin Publications, 1965 (p. 31). Reprinted by permission of the publisher.

Below are a number of questions a teacher might ask his class about the excerpt on the preceding page. Use the following key to fill in the blank spaces:

K = *Knowledge*

C = *Comprehension*

A = *Application*

AN = *Analysis*

S = *Synthesis*

1. What does *adaptable* mean? _____
[Teacher wants a definition.]
2. Summarize these two paragraphs. _____
[Student must give the main points in his own words.]
3. Why do you think eucalyptus trees grow well in both Australia and California? _____
[Student must give an explanation of cause.]
4. What do you think would happen if a eucalyptus tree were planted at the North Pole? _____
[Student is asked to make a prediction.]
5. What changes would we have to make in our environment in order to have camels thrive here? _____
[Teacher wants student to solve a problem.]
6. Why is the ability to adapt so important? _____
[Student must think of an explanation not given in the passage.]
7. Living things that can adapt have the best chance to survive. What evidence can you find to support this idea? _____
[Student is asked to support an idea with evidence.]

Turn the page to check your answers.

Answers

- | | |
|-------|-------|
| 1. K | 5. S |
| 2. C | 6. AN |
| 3. AN | 7. AN |
| 4. S | |

If you made an error, it will be helpful for you to reread the question and its objective.

Please read the following passage:

MARRIAGE IN THE BALKANS

... Fall is the time when most marriages take place. After the harvest there is plenty of food for celebrations. The preparations for the wedding often take several weeks. First a dowry is arranged between the families. The prospective father-in-law of the bride collects the dowry at the girl's home a few days before the wedding. He places the items on his wagon and drives through the town so that everyone may see the value of his son's bride.

In the groom's house the dowry is arranged in the room where the newlyweds will live. Both the men and the women are busy preparing for the wedding feast. Even relatives and neighbors are asked to help and are given a small gift in return.

On the morning of the wedding, the guests gather at the house of the groom's father. A caravan of carriages and buggies finally departs for the girl's house where they will be met by the girl's male relatives. A meal is eaten in the bride's home with the bride and groom at the end of the table.

When the meal is finished, the bride is escorted to the lead carriage of the caravan. Everyone proceeds to the church where a brief ceremony is performed. The party then goes to the groom's house for the wedding feast and celebration which lasts for hours.

The young couple live with the boy's family.³

³ From *Life Cycle* by Pauline K. Persing, Winifred C. Bailey, and Milton Kleg. Athens, Georgia: Anthropology Curriculum Project, University of Georgia, 1969 (pp. 81-82). Reprinted by permission of the authors.

Compose questions you might ask your class about the material on the preceding page. Compose questions in each category listed.

Knowledge

1. _____

Comprehension

1. _____

Analysis

1. _____

2. _____

Synthesis

1. _____

2. _____

3. _____

4. _____

You may wish to compare your questions with the ones we wrote:

Knowledge

1. What is a *dowry*?

Comprehension

1. Describe what the prospective father-in-law does with the dowry.

Analysis

1. Why do you think relatives and neighbors are asked to help prepare the wedding feast?
2. A marriage ceremony not only unites two people; it unites two families. Can you give evidence from your reading to support that idea?

Synthesis

1. What do you think would happen if a Balkan boy and girl decided to elope rather than have a traditional wedding?
2. What do you think happens to Balkan girls whose parents can't afford a dowry?
3. What problems do you think the new bride and groom might encounter in living with the boy's family?
4. Draw a cartoon or a picture showing the difference between an American marriage ceremony and a Balkan marriage ceremony.

MAN'S ADAPTATION

Man, more than any other animal, has been able to survive differences in environment. He is a unique animal. He has even been able to survive for short periods in outer space. He now lives in all parts of the world, from tropical jungles to the frigid Arctic. He can eat all different kinds of food, vegetables, meat, or combinations of them. To a certain degree he can even survive differences in the amount of air available and differences in water pressure. Gravity, too, is no longer an obstacle.

Man originally lived in subtropical climates where his body was well adapted to that environment. Food and water were plentiful and available.

Man migrated out of these regions to climates which were less favorable. However, he did not adapt new features as other animals have. He has not inhabited the earth long enough to evolve different adaptations. Instead, he manufactured his own adaptations. They are outside his body rather than a part of it.⁴

⁴From *Population Patterns of Living Things* by Donald Lundstrom. Newport Beach, California: Franklin Publications, 1965 (p. 31). Reprinted by permission of the publisher.

Compose questions you might ask your class about the material on the preceding page. Compose questions in each category listed.

Knowledge

1. _____

2. _____

Synthesis

1. _____

2. _____

Analysis

1. _____

- 2. _____

Comprehension

- 1. _____

- 2. _____

- 3. _____

- 4. _____

You may wish to compare your questions with the ones we wrote:

Knowledge

1. Where did man originally live?
2. What does *migrate* mean?

Comprehension

1. Why is man a unique animal?
2. Why did man originally live in subtropical climates?

Analysis

1. Why do you think man migrated to less favorable climates?
2. Man's adaptations are outside his body rather than inside. Give examples to support this statement.

Synthesis

1. What kinds of adaptations would you have to make in order to live on the moon?
2. What kinds of adaptations would you have to make in order to live under water?
3. If man could change his body rather than conditions outside his body, what changes would you like to see?
4. Draw a cartoon illustrating man's adaptation to environments around the world.

MODEL LESSON SYNTHESIS QUESTIONS

This model lesson is a transcript of an actual classroom lesson. As you read the transcript, classify the questions that are marked. Circle the appropriate category among the choices offered, then check your answer on the following page and continue reading the transcript.

These students have just completed a unit on the government of Mexico. They are analyzing the functions of governments.

Teacher How does the government of Mexico serve the people?

Circle one *Synthesis* *Comprehension* *Analysis*

Turn the page to check your answer.

Comprehension. This question requires students to describe what they have learned from previous lessons.

Student 1 They give them hospitals.

Student 2 They give them schools for education.

Student 3 Welfare.

Teacher What's welfare? What do you mean by that word?
(to Student 3) [Probing question.]

Student 3 Sort of give people some money so they can help themselves. Help them get an education.

Student 4 They also give them protection, in a war or something.

Teacher Can you tell me what you mean? [Probing question.]

Student 4 If Mexico is in a war, the people have soldiers to protect them.

Student 5 Police.

Student 6 They have orphanages and things like that to keep the kids from being on their own without any parents.

Teacher How does our government serve us in the same way?

Circle one *Synthesis* *Knowledge* *Comprehension*

Turn the page to check your answer.

Comprehension. This question requires students to compare our government with the government of Mexico.

- Student 1** They give us schools for education and to get jobs.
- Student 2** They give us welfare if we need it to help ourselves in case we don't have any money.
- Student 3** Hospitals—veterans—different hospitals, for us and for veterans. It's free, you know.
- Student 4** They have taxes so they can build better schools and the children can go to school and bring up a better family.
- Student 5** They help people by building roads and having parks and national parks for recreation.
- Student 6** They also give us protection. Like if our nation is in war, they can protect the people.
- Teacher** We've thought of a lot of services our government gives us. Now, why does the government give us these services?

Circle one *Analysis* *Knowledge* *Synthesis*

Turn the page to check your answer.

Analysis. This question requires students to analyze motives and causes.

Student 1 Well, if they give us services--like teachers, they teach us and we learn the school teaching, and we teach others and it goes on. Hospitals, the same way, and roads; we learn how to make roads.

Student 2 I think possibly to keep us on top and have good influence with other nations.

Teacher This is why the government offers us services?
(to Student 2) [Probing question.]

Student 2 In a way; power and stuff mostly.

Student 3 I think they offer us these services so the nation won't have a lot of poverty in it, and there won't be a lot of kids without parents and stuff like that.

Student 4 To supply people with work.

Teacher Well, what would happen, then, if a government didn't offer the services you've talked about?

Circle one *Synthesis* *Analysis* *Comprehension*

Turn the page to check your answer.

Synthesis. This question requires students to make predictions.

Student 1 Our nation would go down in popularity. You know, our nation is a very strong nation now, but if the government didn't offer us these services, we would just go down in other respects.

Teacher Why? [Probing question.]
(to Student 1)

Student 1 You see, other countries respect our nation because our nation is very rich and strong, stronger than other nations, and they really build respect for our nation.

Student 2 Maybe because the government keeps our nation together. It would all split up if they didn't.

Teacher If the services weren't offered, our nation would split? [Probing question.]
(to Student 2)

Student 2 There wouldn't be any certain leader.

Teacher Why would this happen? [Probing question.]
(to Student 2)

Student 2 Because there wouldn't be any authority to make . . . You can't just go out and shoot someone now or you'll get in trouble. But if there wasn't any policemen or any military people you could do things like that, and there wouldn't be any leaders to make laws or stuff like that.

Teacher Who do you think would provide the services if the government failed?

Circle one *Knowledge* *Synthesis* *Analysis*

Turn the page to check your answer.

Synthesis. This question requires students to make a prediction.

Student 1 Maybe a rich man would come and have a lot of other rich men behind him, and he would say, "If you come with me and if you leave your country right now, I'll promise you welfare and jobs and good homes and everything."

Student 2 Maybe the people would have to do it for themselves or get a group of people, like about ten different people, to do certain jobs.

Student 3 We could just turn the tables around and, instead of other countries asking us for help, we could ask other countries for help.

Teacher That would be interesting. How can the government of Mexico provide more services for its people?

Circle one *Knowledge* *Synthesis* *Analysis*

Turn the page to check your answer.

Synthesis. This question requires students to solve a problem.

Student 1 They could give them housing, instead of them living in the slums, and they could give them roads and orphanages and hospitals and stuff like that.

Student 2 Yes, but where do they get the money to do this?

Student 1 They don't need the money, really. They could teach the people that live in bad housing, teach them to build houses for all of them and teach them to grow crops and things.

Student 2 But that isn't going to help them to get the money. That isn't going to help them because they don't need to be taught. They already know how to do this. They've been influenced by other people.

Teacher What do you think? Olivia?

Student 3 Is it possible that they could get the money from different governments? Like we give money and stuff to other governments. Maybe we could ask the other governments for money to help support the people.

Teacher All right. Let's shift gears now and think about this one. What would a society be like if there were no government?

Circle one *Analysis* *Knowledge* *Synthesis*

Turn the page to check your answer.

Synthesis. This question requires students to make predictions.

Student 1 People would work individually, you know. They couldn't all unite. They'd have to work individually.

Teacher Why? [Probing question.]
(to Student 2)

Student 1 Because if there were no government they can't go around and ask for help from everybody.

Teacher Uh huh.

Student 1 They wouldn't do it.

Teacher Joe?

Student 2 I think it would be chaos.

Teacher Why? [Probing question.]
(to Student 1)

Student 2 Well, because the economy would fail down, and everything would just fall apart. The country would just go down and down.

Teacher Dave?

Student 3 It would be very easy for another country to take over that country, too.

This concludes Model Lesson You are now ready to prepare your microteach lesson.

INSTRUCTIONS FOR MICROTEACHING

(3)

Purpose

To practice asking the two types of *synthesis* questions appropriate for discussions and to continue asking *analysis* questions and probing questions to improve student answers on the criterion of support.

Before you Microteach

1. Choose a lesson topic appropriate for *synthesis* and *analysis* questions.
2. Plan *synthesis* questions, also plan several *analysis* questions. Write them on the Microteach Form.
3. Teach your microteach lesson.

After you Microteach

1. Follow the same procedures for evaluating your microteach tape

Procedures for Reteaching

1. Vary the reteach procedures to suit your needs and interests.
2. Evaluate your tape, using the same procedure as before.

FORM 8. MICROTEACH FORM

(3)

BOX A. Planned Questions		Student Responses			
		1	2	3	4
<i>Analysis Questions /</i>					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3.	Criterion				
	Probes				
<i>Synthesis Questions /</i>					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3.	Criterion				
	Probes				

4.	Criterion				
	Probes				
5.	Criterion				
	Probes				
6.	Criterion				
	Probes				

BOX B.	Unplanned Higher Cognitive Questions
Tally	
BOX C.	<i>Knowledge, Comprehension, Application Questions</i>
Tally	

Summary

/. Observations

FORM 9. RETEACH FORM

(3)

BOX A. Planned Questions		Student Responses			
		1	2	3	4
<i>Analysis Questions</i>					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3.	Criterion				
	Probes				
<i>Synthesis Questions</i>					
1.	Criterion				
	Probes				
2.	Criterion				
	Probes				
3.	Criterion				
	Probes				

4.	Criterion				
	Probes				
5.	Criterion				
	Probes				
6.	Criterion				
	Probes				

BOX B.	Unplanned Higher Cognitive Questions
Tally	
BOX C.	<i>Knowledge, Comprehension, Application Questions</i>
Tally	

Summary

Observation

APPENDIX E

LESSON ANALYSIS INSTRUMENT

AND

GROUND RULES FOR CODING

Definitions

1. An attempt should be made to code each teacher question/pupil response interaction.

For the purposes of this study:

- (a) A teacher question is a word or group of words having the appearance of being intended to elicit a response.

- e.g. (i) Where do you go for your holidays?
(ii) What would you include in an advertisement in order to boost the sales of the product?
(iii) Describe your reactions when you realized the tyre had burst.

(A question will usually be in the interrogative form as in (i) and (ii), however it may also be in declarative form as in (iii).

- (b) A pupil response is regarded as an answer given in reply to such a question.

TEACHER QUESTION CATEGORIES

Knowledge Category

A question should be regarded and coded as a knowledge question when:

- (a) it requires the pupil to remember ideas, material, or phenomena either by recognition or recall.
- e.g. (i) Sheena, what is the second book of the Bible called?
- (ii) What does exit mean?
- (iii) Name the capital of Sweden.
- (iv) List four cities in Victoria.
- (v) When we added this powder to the water, what gas was given off?
- (b) it seeks to establish the pupils' range of experience, generally to establish a framework within which to develop the lesson.
- e.g. (i) Have you heard of the Consumers' Society?
- (ii) Does your grandfather forget things?
- (iii) Are you first year students?

Coding rules and interpretations

1. In definition (a), recognition should be taken to apply when the format of materials (verbal, illustrative, maps, tables graph) being studied at the time the question is asked, is assumed to be precisely the same as that met by the student on a previous occasion.

e.g. Pupils working from Atlas page showing map of Europe, and asked the question

G: Where is Italy?

(Teacher assumes pupil will recall and recognise Italy on map page before him, having been taught the location of Italy initially from a very similar map.)

2. A question should be considered carefully for inclusion in the knowledge category, if it can be suggested that, to respond to the question, the pupil does no 'work' other than recognize or recall.
3. A question to a pupil seeking advice regarding the spelling of a known word should be regarded as a knowledge question.

Comprehension Category

A question should be regarded and coded as a comprehension question:

when, from information given in the lesson, the pupil is asked to organize, to make some use of, or to perceive the structure of the material or ideas contained in the information.

Although not intended to include all possible varieties of comprehension questions, the following should be regarded as comprehension:

e.g. (i) requiring a description in pupil's own words.

T: Describe what happened after I placed the sodium in the water.

(ii) requiring the statement of a main idea in pupil's own words.

T: What does the poet try to tell us in the second verse?

(iii) requiring a comparison.

T: How does the population of Scotland today compare with that before the Second World War?

Coding rules and interpretations

1. As defined, information may be presented in oral, written, verbal, symbolic, or even concrete form.
2. As defined, 'use of' and 'organization' of the information occurs with concepts which the teacher assumes, or knows, the pupil to have already acquired.
3. A 'description' question should be regarded as comprehension when it seeks a personal interpretation (own words) from the pupil; a question put on the basis of an assumed (known) answer should be regarded as knowledge type.

Application Category

A question should be regarded and coded as an application question:

when, on the basis of knowledge which the teacher knows the pupil has already acquired, the pupil is asked to apply this knowledge to a new situation.

e.g. (i) T: Using these principles as the criteria, with which schools are these painters most closely associated?

or (ii) Having discussed the characteristics of television advertising -

T: What would you put into an advertisement to sell a hair restorer?

Coding rules and interpretations

1. To answer an application question, the pupil needs to know and to be able to select the technical terms or rules that are needed to solve a particular problem.

2. from Bloom et.al., (1956) p.120

"A problem in the comprehension category requires the pupil to know an abstraction well enough that he can correctly demonstrate its use when specifically asked to do so. 'Application', however, requires a step beyond this. Given a problem new to the pupil, he will apply the appropriate abstraction without having to be prompted as to which abstraction is correct, or without having to be shown how to use it in that situation."

Analysis category

A question should be regarded and coded as an analysis question when:

the pupil is required to break down the material into its constituent parts, to detect the relationship of the parts and the way they are organized.

Although not intended to include all possible varieties of analysis questions, the following should be regarded as analysis:

- e.g. (i) the pupil is asked to establish relationships he had not previously realized, to explain relationships by identifying motives or causes.
- T: Why do children spend much of their playtime imagining things and living in fantasies?
- or T: How did the minister's statement result in this action by the parents?
- or T: What is common to all those problems?
- (ii) the pupil is asked to make inferences based on given material.
- T: What does this poem tell us about the poet's own house?
- or T: Now that we have watched our "minigarden" for three months, what can we say about the needs of plants?
- (iii) the pupil is required to find evidence to support generalizations.
- T: What evidence does our experiment provide that the metal is copper?
- or T: Could you suggest why this writer believes a population crisis in the world to be highly probable within the next 50 years?

Coding rules and interpretations

An analysis question intends the pupil to respond in the light of his knowledge of the parts of the material or ideas being studied and the processes of reasoning.

By contrast, comprehension or application questions intend the pupil to use the material to arrive at the response, little attention being devoted to the intellectual process involved in arriving at the response.

Synthesis category

A question should be regarded and coded as a synthesis question:

- (a) when the pupil is intended to draw upon elements from many sources and to put these together into a structure or pattern not clearly there before - a product will result.

Although not intended to include all possible varieties of synthesis questions, the following should be regarded as synthesis.

- e.g. (i) the pupil is asked to make a prediction from the consideration of all the evidence at his disposal.
- T: What changes in Education policy would occur if there were a change in government?
- or T: What hypotheses can we generate from this data?
- (ii) the pupil is asked for an original solution to a problem.
- T: How could we overcome the shortage of water?
- or T: What actions should be taken to counter unemployment in Stirling?
- (iii) the pupil is asked to produce an original communication.
- T: What does it mean to France to be surrounded so much by water?
- or T: What would you say to the public to encourage their support for your plan?
- or T: If you were a poet and climbed a hill and saw a lake surrounded by flowers and trees, what words would you use to describe this?
- (b) when the pupil is asked to adopt a position or stand regarding an issue or makes a judgement.

This type of question would involve two steps

- the setting up of standards or value structures, and
- the determination of how closely the idea or objects meet those standards or values.

- e.g. T: What are your views on the introduction of conscription in Britain?

Coding rules and interpretations

A question regarded as synthesis will certainly involve some cognitive aspects for an appropriate response.

Lower order synthesis category

A question should be regarded and coded as a lower order synthesis question:

when the question does not require the pupil to do more than venture an opinion based upon personal preference.

e.g. T: Did you like that story?

or T: Have you got a favourite advert.?

or T: So you think they make everything look very appealing and very nice?

or T: Which toothpaste would be the best buy?

or T: Which subject do you most enjoy?

Coding rules and interpretations

1. This question type is often evidenced by a potential or actual yes/no response.

e.g. T: Do you think England can win?

or T: Do you like horror films?

2. No cognitive work need be involved by the pupil in offering a response to this question type.

Other categories

(a) Procedural

A procedural question is a question of an organizational or managerial nature.

e.g. T: Can you read my writing?

or T: Did you say monstrous?

or T: O.K.?

or T: Are you going to answer?

or T: Say that again please.

(b) Rhetorical

A question to the pupil where the response is assumed or contained within the question, and the teacher gives no opportunity for a response.

e.g. T: That would be a good idea, wouldn't it? It's been successful before . . .

or T: Well it wouldn't really be normal, would it? After all, the . . .

or T: That's quite old, isn't it? Do you notice . . .

Coding rules and interpretations

1. Rhetorical and procedural questions will be ignored for the purposes of coding.
2. A rhetorical question which is followed by a pause as if soliciting a response or which does attract a response should be regarded and coded as one of the question categories knowledge, comprehension . . . synthesis.
3. Use of the negative term 'not' in a question - see General Coding Rules - teacher questions para 2.
4. A question to a pupil seeking advice regarding an appropriate spelling for a fictitious word should be regarded as a procedural question.

e.g. T: How do I spell "Squidoh"? (a fictitious name suggested by the student for a hair restorer)

A question concerning the correct spelling of a known word should be regarded as a knowledge question.

GENERAL CODING RULES - TEACHER QUESTIONS

1. Verbal teacher or pupil activity which is either wholly or partially inaudible on the audiocassette, or is noted on the transcript should be coded U. Similarly, if the teacher or pupil activity is incomplete and is therefore unintelligible.

e.g. (i) T: Do you --xxxx-- (from transcript)

(The symbols --xxxx-- on the transcript indicate a large number of words were inaudible, and this probable question would be coded as U, and the response ignored)

(ii) P: Well, they make sort of . . . and that . . .
(from transcript)

(The symbols . . . on the transcript indicate the pupil is hesitating and not completing his answer, such that no clear meaning arises out of his response. The response is therefore coded U)

2. When the negative term "not" is used in a teacher question or a pupil response and, in your opinion, its use is consistent with the general expression habit of the Scots, then you should disregard this segment of the question in deciding on the appropriate coding of the whole question.

e.g. T: Have you not heard of the superiority of the Australian cricketers?

(The 'not' should be disregarded and the question read as "Have you heard of the . . . superiority of the Australian cricketers", and therefore coded as a knowledge question.)

3. In the event of some ambiguity in regard to the meaning of a question, the question should be interpreted literally and a decision made.

Should a coder still be unable to decide between two categories in the coding of a question, then the question should be coded in the lower of the 'categories' in mind, assuming an ascending order of question categories beginning with knowledge and rising to synthesis. Lower order synthesis should be regarded at the same level as knowledge.

4. (a) Irrespective of whether a question is followed by a pause, the first general request to all pupils for a response or the nomination of a pupil by name should be regarded as part of the first asking of the question.

- e.g. (i) T: How does population growth produce other problems? Anybody?
- (ii) T: How does population growth produce other problems? John?
- (iii) T: How does population growth produce other problems? . . . pause . . . John?
- (iv) T: How does population growth produce other problems? . . . pause . . . Do you know, John?
- (v) T: Can anyone suggest how population growth produces other problems?

(Each of these examples should be regarded and coded as ONE question - probably analysis.)

- (b) A subsequent general request for a response to the question, or nomination of a second pupil, should be regarded as a second asking of the same question.

- e.g. (i) T: How does population growth produce other problems?
John? . . . pause . . . Anyone else?
- (ii) T: How does population growth produce other problems?
. . . pause . . . Sally? . . . pause
. . . Katrina?

5. (a) When a question is followed without pause by another relevant teacher comment and, without further solicitation, a response is made, then

the comment should be regarded as part of the question.

- e.g. T: Imagine when you get older, what happens to all your friends? Say, you are about 80 or something.

P: They die.

- (b) If a pause follows the question, then the subsequent teacher comment should be considered as a quite separate identity.

- e.g. T: Do children really believe what they're playing at is real? . . . pause . . . or do they know it's just a dream.

P: They believe in it.

(The question prior to the pause would probably be regarded as lower order synthesis gaining no pupil response, and the comment following the pause as a prompt which solicited a restricted response.)

6. (a) The second or subsequent question seeking further responses to the same initial question should be regarded and coded as a second asking of the same question.

e.g. T: What does it mean to France to be surrounded so much by water?

P: They eat a lot of fish.

T: (perhaps after discussion) Now, what else does it mean for France - to be surrounded by so much water?

(Both questions should be regarded as probably synthesis, and the response original.)

- (b) Deletion of the second T: question above and replacement by

T: (perhaps after discussion) That was a useful answer - what else . . . something else like that . . . does it mean for France - to be surrounded by so much water?

Would provide an example where a clear indication had been given by the teacher of the desired sort of response, and in this situation, the second question should be regarded and coded as an application or possibly a comprehension question.

PUPIL RESPONSE CATEGORIES

Restricted Responses

A response should be regarded and coded as a restricted response, when:

the pupil responds directly and predictably to a question seeking fairly specific information. The response is structured or limited by the situation.

- e.g. (i) T: Have you heard of the horse with wings before?
(knowledge question)
- P: Pegasus (restricted response)
- (ii) T: What would make you buy a particular chocolate?
(probably synthesis question)
- P: The wrapper (restricted response)
- (iii) T: When was the Battle of Bannockburn?
(knowledge question)
- P: 1314 (restricted response)

Coding rules and interpretations

The variable, support, should be considered in association with each restricted response.

Original responses

A response should be regarded and coded as original when the pupil response contains evidence of independent, often creative, thought. The pupil may express his own ideas, suggest his own approach to a problem, or develop his own theories or explanation.

- e.g. (i) T: How could we design an experiment to find out the main contributing factor?
(synthesis question)
- P: Place the plant in a bell jar in a dark cupboard for 24 hours
(original response)
- (ii) T: What effect would a change of government have on the handling of this dispute?
(synthesis question)
- P: I believe it would only affect the duration of the negotiations.
(original response)
- (iii) T: Do you think people will buy our product?
(lower order synthesis question)
- P: It would have to be proved effective over many test cases
(original response)
- (iv) T: What else can France do with the fish caught off her shores, apart from eating it
(synthesis question)
- P: They could export it - freeze it and then export it
(original, supported response)

Coding rules and interpretations

1. An original response may often be recognised because it adds to the lesson in a constructive way; it extends the visible lines of development of the lesson.
2. The variable, support, should be considered in association with each original response.

Supported Responses

The element of support should be regarded and coded as contained in the pupil response, when:

the pupil response contains reasons, facts, examples or explanations of the criteria or assumptions on which the answer is based.

e.g. (i) T: Why does your husband keep his money in a shoe?
(probably analysis question)

P: He hasn't a great deal of confidence in the bank ever since he saw the manager at the races.
(original, supported response)

(ii) T: Do you see how population is a problem (contributing to pollution) as well?
(lower order synthesis question)

P: Aye, the more people there is, the more pollution there is.
(original supported response)

Coding rules and interpretations

1. The variable support should be considered in association with each original or restricted pupil response, and coded when positive behaviour is noted.
2. The idea of support is similar to that described by Rosenshine (1968) in his measure concerning the adequacy and effectiveness of student explanations. In connection with this, positive behaviour, i.e. support, seemed related to the occurrence of words and phrases such as "in order to", "therefore", "because", "if. . . then", "consequently", "why", "since", "so", "by", "through", "as", "before" and "for".
3. An appropriate cognitive response to a teacher question asking "why?" should usually be regarded and coded as supported. The response need not again contain the elements of the first response, which led to the 'why' question being asked, except by implication.

e.g. T: Do you think people will buy Squidoh?
(a fictitious hair restorer)
(lower order synthesis question)

P1: No (restricted response)

T: Why not? (analysis probe)

P1: You would have to prove it first with lots of people.
(Response, by implication, is "No, because . . ." and therefore is coded original, supported response.)

No Opportunity to Respond

The category and coding 'no opportunity to respond' should be used when:

a period of less than one second elapses between a teacher statement regarded as a question and the next teacher statement.

e.g. (i) T: What do you look for, you know what would make you buy a particular chocolate?

('What do you look for' is regarded as a question (lower order synthesis) to which the student has no opportunity to respond.)

(ii) T: Do you think that they are lying? . . . do you think that they are lying when they put these advertisements on?

(the first question (lower order synthesis) is followed by a pause, but a pause of less than one second, and consequently is regarded as a question to which the pupil had no opportunity to respond.)

(iii) T: What do you think this means to France? What do you think it means to be surrounded so much by water?

(the first question, synthesis, is immediately followed by the second question giving the student no opportunity to respond.)

Coding rules and interpretations

1. Irrespective of whether a question is followed by a pause, the first general request to all pupils for a response, or the nomination of a pupil by name should be regarded as part of the first asking of the question.
(see General coding rules - teacher questions para.4)
2. When a question is followed without pause by another relevant teacher comment and, without further solicitation, a response is made, then the comment should be regarded as part of the question.
(see General coding rules - teacher questions para.5)

No Response

Following the asking of a teacher question, the absence of any form of pupil response should be regarded and coded as no response.

e.g. (i) T: Do you know anything about Pegasus? . . . p. . .
No? . . . p. . . Have you heard of the Gordons?

P: No

(The first question, knowledge, should be coded as 'no response'. The single word 'No?' is regarded as a second question of the same type; again there is no response. The third question, knowledge, gains a restricted response.)

(ii) T: What makes this line between France and Spain?
(knowledge question)

P: eh. . . (considered no response)

T: Is it a river or is it hills? (knowledge prompt)

Coding rules and interpretations

1. A response to a procedural question following a teacher question will be disregarded and itself be regarded and coded as a no response.

e.g. T: What measures are being taken to combat air pollution? (knowledge question)

P1: Smokeless fuel (restricted response)

T: Watson, let's see an answer from you
(knowledge question)

Can you not think of anything, Watson?
(procedural question)

P (Watson): No
(response to procedural question, disregarded, and knowledge question to Watson coded as gaining no pupil response).

GENERAL CODING RULES - PUPIL RESPONSES

1. Wholly or partially inaudible or unintelligible responses should be coded as U.

(see General coding rules - teacher questions, para.1)

2. An appropriate approach to the categorization of responses is to take note of the whole responses, and ask the questions, in order

"is it original?"

or "is it restricted?"

followed by

"is it supported?"

3. Responses to knowledge, lower order synthesis, comprehension and, perhaps, application questions should be coded

(a) as restricted, if the response approximates to the bare minimum response which the question appears to allow or to be seeking

(b) as original, if the response clearly goes beyond the bare minimum response which the question allows or appears to be seeking

e.g. T: Do you think that proves it
(assume lower order synthesis question)

P1: Yes (restricted response)

P2: We would need to see the condition of the towel before it was washed..
(original, supported response)

4. A response, either restricted or original, may be separated from the relevant teacher question by intervening discussion or other responses. The separated response should still be coded as a response to its relevant question and this link indicated by a line between the response symbol and question symbol.

e.g. T: What war films have you seen? (knowledge question)

P1: Twelve O'clock High (restricted response)

P2: The Dam Busters (restricted response)

T: The Dam Busters - was that the one about the bombing of the German dams? (knowledge probe)

P's Yes (restricted response)

P3: The Great Escape (restricted response to initial question)

P3 response is to the initial teacher question and therefore linked to it in the coding. This sequence would appear coded as

K : $\overset{\text{qRR}}{\text{RR}}$

5. (a) Responses to a question from more than one pupil which can be distinguished and considered separately should be coded individually and in sequence

e.g. T: What are the summer months? (knowledge question)
 P1: September (restricted response)
 P2: July (restricted response)
 P3: It depends which part of the world you are talking about. (original, supported response)

This sequence would appear coded as

K : q RR^oS

- (b) The symbol $\overset{\circ}{R}$ should be used to indicate more than one simultaneous response where the coder is confident the responses are of the same restricted type.

e.g. (i) T: What are the summer months?
 (knowledge question)
 P's: (simultaneously)
 July (responses not individually distinguishable - yet coder is confident they were of this restricted type.)
 September
 July
 August

In this event, the sequence would appear coded as K : q $\overset{\circ}{R}$

(ii) T: Do you like horror films?
 (lower order synthesis question)
 P's: (simultaneously)
 yes/yes/no/uh-huh
 (responses not individually distinguishable, yet coder is confident they were of the same restricted type.)

Coding as for (i)

- (c) Should the coder lack such confidence to use either the R symbol or the $\overset{\circ}{R}$ symbol, then the symbol U should be used (see rules, para.1)

6. Responses which appear to the coder to be inappropriate in regard to the question asked, or merely hopeful guesses should be coded as restricted. The divergence of such responses should not tempt the coder to allot the category of original response:

e.g. T: (speaking of a boundary between two countries)
Is it a river - or is it hills? (knowledge question)

P1: A river (restricted response)

P2: A fence patrolled by soldiers
(divergent, but inappropriate response and therefore coded as restricted)

P3: It starts with a "p" (restricted response)

T: Uh-huh, so it does

P: Peninsula (a hopeful guess, therefore coded as restricted)

T: No.

7. A response which, taken by itself may appear to be original should be regarded as restricted when it merely reiterates and covers much the same ground as an earlier original response to the same question.

e.g. T: Do you think people will buy Squidoh
(a fictitious hair restorer)
(lower order synthesis question)

P1: No (restricted response)

T: Why not (analysis probe)

P1: You would have to prove it first with
lots of people (original, supported response)

P2: Yes, that's right, you would need to
prove it first (coded restricted after first
P1 response)

8. Each response should be judged as to whether it contains the element of SUPPORT.
9. Responses to PROCEDURAL-category questions will be ignored for the purposes of coding.

TEACHER BEHAVIOUR SUBSEQUENT TO INITIAL QUESTION

Probing Questions

A question should be regarded and coded as a probing question when it is an extension of a pupil response and arises directly out of the pupil's response. The question is intended to clarify or develop further the student's response to a previous question.

- e.g. (i) P: (in response to initial question)
The world is getting dirtier all the time
(original response)
- T: What do you mean by the world?
(comprehension probe)
- P: The earth we live in
(restricted response)
- T: The earth, yes, and what else?
(comprehension probe)
- (ii) P: There are too many trees on the land
(original response)
- T: What makes you think that?
(analysis probe)
- or T: How does this create a problem?
(analysis probe)
- (iii) T: If you were old, would you like to have your
own house?
(lower order synthesis question)
- P: Yes (restricted response)
- T: You would - why? (analysis probe)
- (iv) T: What can countries do to combat the
population crisis? (assume synthesis question)
- P: Make laws (original response)
- T: What kinds of laws (synthesis probe)

Coding rules and interpretations

1. Teacher repetition of a pupil response should be coded as a probe if the sense of the teacher comment is consistent with the request to the student. "Is that what you meant?" If the sense of the teacher comment is consistent with the request to the pupil "Is that what you said?" then the comment should be regarded as procedural rather than as a probing question.

e.g. P: (in answer to question)
Iceland (restricted response)

T: You mean the country, or (knowledge
ice lands? probing question)

or T: Who said Iceland? (procedural question)

2. A teacher probe is clearly indicated if it is consistent with the sense of "making an incision" in the pupils' response.

A Prompt

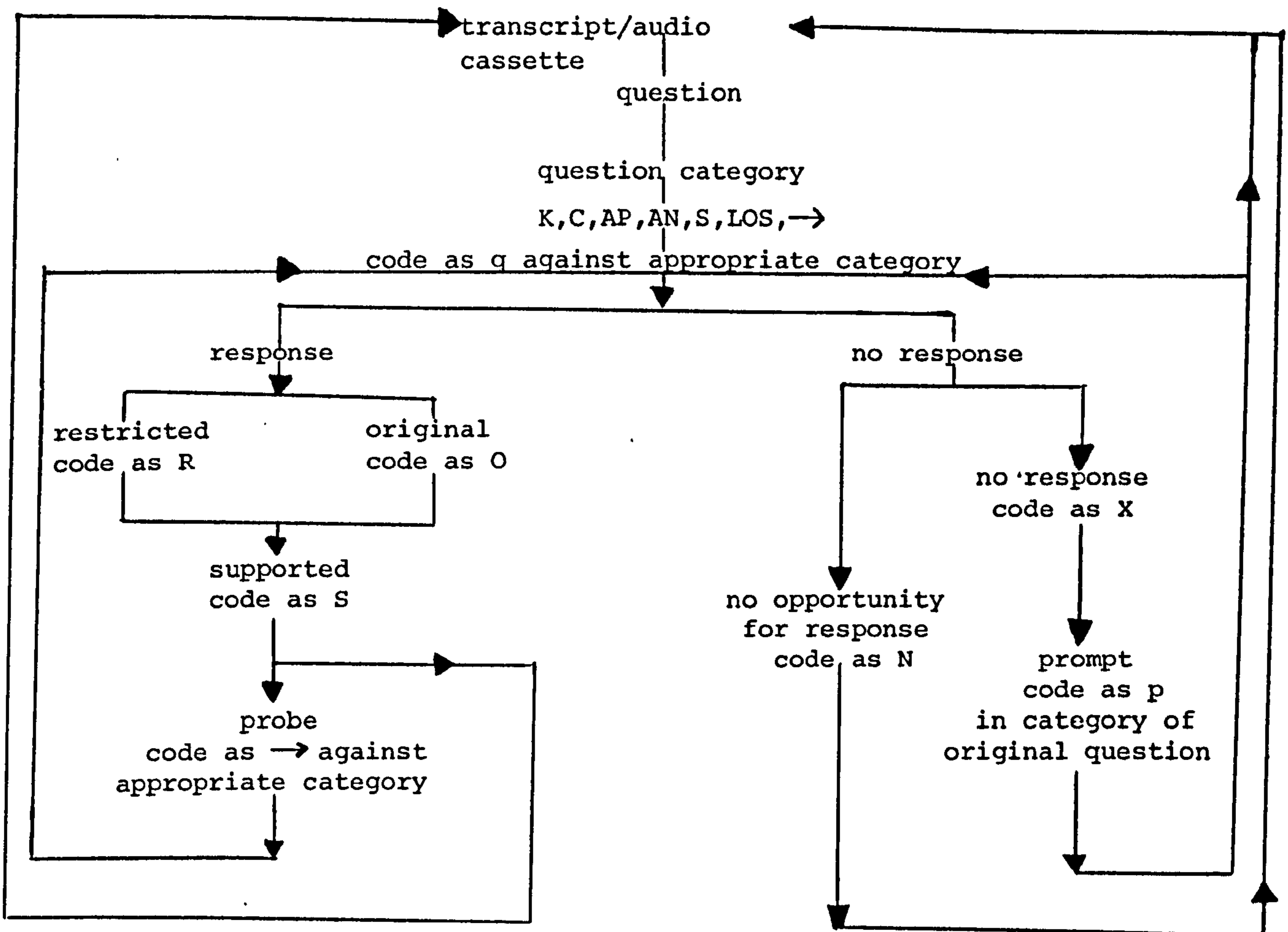
A word or group of words should be regarded and coded as a prompt when

in the absence of a response to an initial question, (i.e. when an opportunity has been given to respond and there has been no response), the teacher again solicits a response by offering some clue to the initial question, often in the form of a restructured question.

- e.g. (i) T: Do children really believe what they're playing at is real? . . . p . . .
or do they know it's just a dream?
(lower order synthesis question to which there is no response followed by a lower order synthesis prompt)
- P: They think it's a dream
(restricted response)
- (ii) T: Why don't you like it? . . . pp. . .
What don't you like about it?
(probably analysis probe to which there is no response followed by an analysis prompt)
- (iii) T: What would you do if we wanted to show what Squidoh (fictitious hair restorer) could do?
. . . p . . . You would show a man as you said before . . . (knowledge question to which there is no response followed by a knowledge probe which gathers a restricted response)
- P: with hair on

Coding rules and interpretations

1. A prompt may follow only when an opportunity to respond has been given. (see also General coding rules - teacher questions, para.5)
2. A prompt should always be coded in the same category as the original question.
3. A prompt may only be considered for relevancy to the last substantive question.

CODING SEQUENCE FLOW CHART

CODING SYMBOLS

variable	symbol
question	q
<u>question category</u>	
knowledge	K
comprehension	C
application	AP
analysis	AN
synthesis	SX
lower order synthesis	LOS
probe	→
categorized as one of the above types e.g. analysis probe	AN→
probe, not from immediately preceding coded response	↗
prompt	P
partially or wholly inaudible/unintelligible question	U
<u>response category</u>	
restricted	R
original	O
more than one, separate distinguishable restricted restricted responses	RR (two responses)
more than one simultaneous response with coder confident they are restricted	\dot{R}
more than one, separate distinguishable original responses	OO (two responses)
restricted response, supported	RS
original response, supported	OS
no opportunity for pupil response	N
no pupil response	X
response (delayed) linked to relevant question	q $\overbrace{RR-RR}$
partially or wholly inaudible/unintelligible question	u

TRANSCRIPT SYMBOLS

- | | | |
|----|--------------------------------------|---|
| 1. | T: | teacher statement |
| 2. | P: | pupil statement |
| 3. | | pause in speech |
| 4. | ...p... | pause of approximately ONE second following a teacher question. Pause anticipates a pupil response; when the response does not come in this time interval, the teacher continues in some way. |
| 5. | ...pp... | pause of more than ONE second
.....as for (4) |
| 6. | - - - | ONE/TWO words inaudible |
| 7. | - - x - - | approximately FIVE words inaudible |
| 8. | - - x x - - or - - x x x - -
etc. | more than FIVE words inaudible |
| 9. | / / | oblique line separates several simultaneous pupil responses where only a few words are audible |

SAMPLE SCRIPT A

	<u>Coding</u>	<u>Notes</u>
T: Do you boys all watch television?	K:q	Seeks feedback of pupil experience
P's: Yes	R	
Pl: We have had that before . . . we . . .	R	
T: Have you?	Procedural)	Ignored for purposes of coding
Pl: We had it this morning already. . .)	
)	
T: Well let me . . . do you watch the S.T.V. - the commercial programme that has all the adverts on it?	K:q	
P: Yes	R	
T: Do you . . . have any of you got a favourite advert?	LOS:q	Seeks personal preference
P: Cadbury's chocolate	R	
T: The Cadbury's one . . .		
Pl: There's a new one out . . .		
P2: I like them all	R	
Pl: . . . and its dracula - he comes out of the coffer and he steals a Cadburys chocolate bag (Laughter)	OS	Goes beyond bare minimum, and gives example in support
T: You like that do you?	LOS:q	
Pl: Yes, I like that one	R	
T: Why do you think people have..em.. put adverts on T.V.?	AN:q	Possibly K:q however question includes both ideas about advertising and television, and thus probably requires analytic processes
Pl: They . . .	U	unintelligible

	<u>Coding</u>	<u>Notes</u>
P2: To make you buy them	RS	predictable minimum response statement implies support
P3: To sell them really	RS	"
P4: --x--	U	
P5: To persuade you to buy them	RS	"
T: To persuade you to buy them?	Procedural	Consideration also given to probe. No indication that the teacher's words are doing more than "You say that". Thus procedural and ignored in coding
P: Yes		
P2: The Heinz Beans advert - he gets £15.		Divergent response regarded as student initiation and thus ignored in coding
T: £15. Well, I mean, if you were, if you were going to buy something you know, if you were going to buy Cadbury's chocolate or something like that, er, what would you look for, you know what would make you buy a particular chocolate or a sweetie?	LOS:qN SX:q	No opportunity for response Question seeks a reasoned statement by pupil
P: I would look for the wrapper	R	
T: The wrapper. You would look for the wrapper - and the advert - what do you like about the adverts - that makes you want to buy them - say the Mars bars one or the polo mint?	LOS:q	Even literal translation of question may not resolve doubts in this possible LOS or AN question. Decision on lower type
P: They're exaggerated	O	A relevant response which gives teacher the opportunity to develop the lesson in this direction

	<u>Coding</u>	<u>Notes</u>
T: They are exaggerated?	Procedural	ignored for purposes of coding
P's: --x--/--x--/--x--		
P: It's mouthwatering	R	predictable
T: It's mouthwatering?	Procedural	
P1: Yes		
P2: Well they make sort of . . . and that . . .	U	Probably a response to the last question but unintelligible
T: Uh-uh . . . (Laughter)		
T: They just make it look good do they?	K:→	A question which seeks to draw the students out on their R responses to the original question. Poorly phrased.
P1: Yes		
P2: Its real stupid really	O	Response has nucleus of independent thought on issues of question
T: You think its stupid?	LOS→	Again, poorly phrased probe with emphasis on affective domain
P: They should just show the advert in the . . . they should just say buy our Cadbury's chocolate instead of . . .	O	Consideration may be given as to whether this response is supported. (By implication, student is beginning response with 'because')
T: Say if you were buying, let's have a look --x-- say you were going to buy some cigarettes - what would make you buy those ones?	AP:q	AP coding assumes necessary abstraction to this new situation has been established earlier. If not, this is probably an analysis question.

	<u>Coding</u>	<u>Notes</u>
P: Well, the pretty bowl. . .	R	
T: See that one there, did you like that? Do you like that ad?	LOS:qN LOS:q	
P1: Not really	R	
P2: Yes	R	
T: Why don't you like it? . . pp . . What don't you like about it?	AN→X ANp	Probe requiring pupil to justify answer. Slightly restructured question a prompt. Prompt, in this case, does not give any indication of structure of response required.
P2: It looks refreshing	O	
T: It looks refreshing . . . why does it look refreshing?	AN→	Probe seeking justification of response.
P: --x--/--x--/--x--	U	

Sample Script A: Coding Schedule

Audiocassette/transcript

Number: Sample A

Coder: HDB

Time for complete coding:
40 mins.

K	qRRqR	See Note 2	→O
C		Why do you	
AP		think people...	
AN	See Note 7	qURSRURS	What would make you buy
S		Do you ... have any of you	qR You think it's stupid
LOS	qRROS qR	qN	qORU →O

K			
C		What don't you like about it?	
AP	qR		
AN		→X _p O→U	
S			
LOS	qNqRR		

Notes:

1. Symbols follow sequence of script. Coding should continue to move from left to right irrespective of vertical move between question types.
2. It will greatly facilitate the checking of completed coding sheets if an indication was given occasionally (every two minutes) of wording of question to which symbol applies.

SAMPLE SCRIPT B

	<u>Coding</u>	<u>Notes</u>
T: You know . . . you've heard about the pollution problem	K:q	Appears rhetorical however pupil responds, thus question coded
P: Yes	R	
T: You have? Well, in the same way as smoke and chemicals pollute the air, smoke that you inhale into your lungs could damage your body, couldn't it?	Rhetorical	Rhetorical, thus ignored in coding
Well, it's pollution we are going to talk about. This is the introduction. Now can anyone tell me what they think the pollution problem is and what it means?	AN:q	Question seeks insight and meaning
P1: The world is getting dirtier all the time and it's harder to live in it.	O	
T: That's right. Well, what do you mean by the world?	C:→	Teacher probes understanding and expression by pupil in his own words
P1: The earth we live in.	R	
T: The earth, yes, and what else?	C:→	
P2: The sea.	R	predictable minimum response
T: The seas.		
P3: Things in the sea . . . (many P. voices)	O	Constructive to lesson further development
T: And the air - very good. By here, you're quick. Em . . . now what do you think causes them to become dirtier?	K:q	
P1: Smoke	R	

	<u>Coding</u>	<u>Notes</u>
T: Smoke . . . in the air, yes, and rubbish in the sea and on the ground, yes. And who do you think causes the pollution problem? . . . p . . . Do people help cause pollution?	K:qX K:p	Question - no response forthcoming and followed up by a prompt
P's (more than one) Yes	R	Coder confident of group of same response types
T: Partly yes		
P:2 Factories . . . x . . .	U	Cannot be reliably coded as R or O response
P:3 Everybody smoking . . .x . . .	U	
T: Well, yes. Factories in particular and everybody in general. That's right. Well, how's . . . in what way does everybody help create this problem?	AN:q	
P: Because when they put their rubbish into their bin and the dustman takes it away, they just dump it in a dump or something. They don't bury it or anything.	OS	A reason is offered for rubbish being everywhere

Audiocassette/transcript

Sample Script A: Coding Schedule

Number: Sample B

Coder: HDB

Time for complete coding:
15 mins.

K	qR	What do you mean by the world?	qRqXpRUU
C		→R→RO	
AP			Who causes the pollution problem?
AN	qO		qOS
S			
LOS			

TRAINING PROGRAMME SCHEDULE

Meetings 10 a.m. each day.

- | | | |
|---|------------|--------------------|
| <u>Session 1</u> | (2½ hours) | Wednesday 26 July |
| <ol style="list-style-type: none"> 1. Categories, definitions, sample draft coding sheet 2. Reading guides 3. View films | | |
| <u>Session 2</u> | (2½ hours) | Thursday 27 July |
| <ol style="list-style-type: none"> 1. Discussion of categories (brief) (OH/p transparency) 2. Continuation whilst marking transcript (1) Portable screen | | |
| <u>Session 3</u> | (2½ hours) | Friday 28 July |
| <ol style="list-style-type: none"> 1. Marking from transcripts 2. Discussion arising out of transcripts (2), (3) | | |
| <u>Session 4</u> | (2½ hours) | Monday 31 July |
| <ol style="list-style-type: none"> 1. Marking from transcripts 2. Discussion arising out of transcripts (2), (3) | | |
| <u>Session 5</u> | (2 hours) | Tuesday 1 August |
| <ol style="list-style-type: none"> 1. Marking from audioscripts 2. Discussion arising out of audioscripts (1), (2) | | |
| <u>Session 6</u> | (1½ hours) | Wednesday 2 August |
| <ol style="list-style-type: none"> 1. Marking from audioscripts 2. Discussion arising out of audioscripts (1), (2) | | |
| <u>Session 7</u> | (2 hours) | Thursday 3 August |
| <ol style="list-style-type: none"> 1. Marking from audioscripts 2. Discussion arising out of audioscripts (1), | | |
| <u>Session 8</u> | (3 hours) | Monday 7 August |
| <ol style="list-style-type: none"> 1. Further practice marking as required 2. Final modifications to coding sheet 3. Outline of reliability experiment | | |

APPENDIX F

QUESTIONNAIRE TO STUDENTS

AUTUMN SEMESTER 1972

UNIVERSITY OF STIRLING

DEPARTMENT OF EDUCATION

EDUCATION 13, AUTUMN SEMESTER, 1972

QUESTIONNAIRE

This questionnaire is relevant to that section of the Education 13 course concerned with questioning behaviours.

Candid, thoughtful responses would be much appreciated.

Of course, all responses will be treated as highly confidential. You are asked to supply your name, but the identification of an individual's questionnaire will only be used to establish statistical relationships between your responses and other data.

No personal records will be kept.

NAME: _____

- * TEACHING PROGRAMME TAKEN: STIRLING/ALTERNATIVE
- * TECHNICAL FEEDBACK: REPLAY BY AUDIO TAPE/VIDEOTAPE
- * INTER-PERSONAL FEEDBACK: STAFF TUTOR PRESENT/ABSENT
- * Underline correct responses

SECTION ONE

Listed below are a number of statements of behaviours concerned with questioning in the classroom. With regard to each of these statements you are asked to do three things.

1. Indicate in the first column (headed OBJECTIVE VALUABLE) whether you believe the behaviour to be valuable for classroom teaching.
2. Indicate in the second column (headed PROGRAMME HELPFUL) whether the structure of the programme (including lectures, seminars, microteaching sessions) was such that it helped you to plan for, and to practise the behaviour.
3. ONLY TO BE COMPLETED AFTER THE FINAL QUESTIONING LESSON

Indicate in the third column (headed IMPROVEMENT) whether you believe your performance in the behaviour improved over the period of the microteaching programme.

On each occasion,

- * a YES response should be indicated by a tick (✓) in the appropriate column
- * a NO response should be indicated by a cross (x) in the column
- * make a decision yes/no according to whichever response is closest to your own opinion. Further comment or qualification may be made at the conclusion of the questionnaire.

Complete
AFTER
Final lesson

STATEMENT OF BEHAVIOUR	OBJECTIVE VALUABLE	PROGRAMME HELPFUL	IMPROVEMENT
<ol style="list-style-type: none"> 1. To ask questions designed to encourage the pupils to use previously learned ideas in contexts different from those encountered 2. To structure questions which do <u>not</u> imply a particular answer or impose an unintentional bias upon the answer 3. To ask questions, which determine the pupils' initial interests, attitudes, knowledge, or skills relevant to the lesson to follow 4. To ask questions designed to set the pupils a task which is planned to help them achieve selected goals 5. To ask questions designed to encourage the pupils to produce new ideas based upon a sifting of ideas from many sources 6. To ask questions only when one is facing the pupils 7. To ask questions which seek to establish whether pupils have understood concepts or relationships in the material under discussion 			

STATEMENT OF BEHAVIOUR	OBJECTIVE VALUABLE	PROGRAMME HELPFUL	IMPROVEMENT
8. To ask questions as a follow-up to pupil responses which are vague or only partial completions of the set tasks			
9. To ask questions designed to help pupils achieve goals other than memorization of knowledge			
10. To ask questions designed to encourage the pupil to apply a known idea to a new situation			
11. To ask questions to encourage the pupil to organize or use ideas encountered in familiar contexts			
12. To ask questions designed to encourage the pupil to analyze a problem or situation			
13. To give notice to a pupil of an impending question			
14. To offer some clue, or ask a question in a restructured form when the pupil does <u>not</u> respond to an initial question			
15. To ask questions which seek to develop the pupils' ability in general skills of thinking			
16. To pay attention to individual pupil responses			

STATEMENT OF BEHAVIOUR	OBJECTIVE VALUABLE	PROGRAMME HELPFUL	IMPROVEMENT
17. To engage all members of the class in the lesson			
18. To ask questions designed to encourage pupils to break down material into constituent parts, and to detect the relationship of the parts and the way they are organized			
19. To ask questions which encourage the pupil to exemplify a given idea, to justify a conclusion, or to outline criteria for an expressed opinion			
20. To ask questions which encourage pupils to contribute information concerning their acquired knowledge, experiences, interests, and attitudes			
21. To structure questions which already indicate to the pupils the sort of answer required			

SECTION TWO

These questions are concerned with specific parts of the micro-teaching component of the programme.

Indicate your response by underlining the alternative which corresponds most closely to your own opinion. Generally, you will be asked to underline one alternative, however on a few occasions you will be invited to underline more than one response.

At the conclusion of this section an opportunity is provided for you to offer further comment and concise argument in support of your viewpoint on any particular question. In addition, you may wish to focus upon an issue not raised by the questions which follow.

1. It may be suggested that the 'printed handouts' received at lectures, (Stirling or Alternative course) serve several purposes. How valuable have you found these handouts in the following respects?

(a) clear definition of the particular behaviours to be practised

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable

(b) explanation of the relevance and purposes of the behaviour in teaching

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable

(c) practice, on written examples, in identifying the behaviour

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable

(d) practice, based on stimulus material, in writing examples of the particular behaviour

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable

(e) provision of written transcripts of 'model' lessons giving examples of the use of the behaviour in the classroom

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable

2. (You may underline more than one alternative)

Many of the questioning behaviours were specified in close association with the categories of Bloom's "Taxonomy of Educational Objectives" i.e. knowledge, comprehension, application, analysis, synthesis.

This approach

- (i) provided a clarification of ideas concerning the behaviour,
 - (ii) introduced an unrealistic element regarding application to the classroom,
 - (iii) provided neither a positive nor a negative impetus to the study,
 - (iv) assisted in establishing the purpose and relevance of the behaviour,
 - (v) dissected the ideas to the extent that the concept of teaching was lost.
3. How helpful to you were the films or videotapes of 'model' lessons in clarifying your ideas of the various behaviours and in exemplifying the use of these behaviours in a variety of classroom situations?
- (i) very helpful
 - (ii) fairly helpful
 - (iii) not very helpful
 - (iv) not at all helpful

Specific comment outlining the criteria for your answer would be helpful.

4. In planning your teach session what proportion of your time was spent on thinking about what you would discuss with the pupils (subject matter), and what proportion on the characteristics of the specific questions you intended to ask the pupils?
- (i) Most time given to subject matter
 - (ii) About the same time on each
 - (iii) Most time given to specific questions

5. What period of time did you spend planning for your teach session?

- (i) approx. $\frac{1}{2}$ hour
- (ii) approx. 1 hour
- (iii) approx. $1\frac{1}{2}$ hours
- (iv) approx. 2 hours
- (v) approx. 3 hours
- (vi) 3 hours or more

6. During your microteaching lessons did you have difficulty in focussing your attention upon the behaviours you were practising?

- (i) yes
- (ii) no

7. (You may underline more than one alternative)

If your answer to question 6 was yes, which of the following contributed significantly to this difficulty?

- (i) you did not have a clear idea of the behaviour to be practised,
- (ii) the behaviour could not be separated from other aspects of your teaching,
- (iii) you were distracted by the feeling of being observed,
- (iv) the short lesson prevented the development of your attempt to practise the behaviour,
- (v) response of the pupils was disheartening
- (vi) the subject matter chosen was inappropriate for the behaviour practised,
- (vii) response of the pupils led the discussion into other fields,
- (viii) you had misleading preconceptions about the abilities or previous knowledge of the pupils,
- (ix) other reasons (specify)

8. (You may underline more than one alternative)

Which of the following describe the procedure adopted during the replay session?

- (i) actual replay proceeds with little or no comment,
- (ii) aspects of the lesson are discussed as they occur,
- (iii) staff tutor uses evaluation sheet,
- (iv) student uses evaluation sheet,
- (v) staff tutor notes points for subsequent discussion,
- (vi) student notes points for subsequent discussion.

9. (You may underline more than one alternative)

Irrespective of whether a replay session occurred in the presence of a staff tutor or a self-evaluation approach was taken, significant aspects of appraisal during or following the replay of the lesson concerned

- (i) the 'strengths' (appropriate behaviour) of the lesson,
- (ii) the 'weaknesses' (inappropriate behaviour) of the lesson,
- (iii) subject matter (content),
- (iv) questioning abilities,
- (v) other teaching activities,
- (vi) planning the reteach lesson.

10. Irrespective of whether your replay sessions centred around an audiotape recording, or a videotape recording was available, indicate your degree of satisfaction with the replay session.

- (i) completely satisfactory
- (ii) quite satisfactory
- (iii) barely satisfactory
- (iv) unsatisfactory

11. You may underline more than one alternative)

If your answer to question 10 was (ii), (iii), or (iv), which of the following factors contributed significantly to the lack of satisfaction?

- (i) lack of staff tutor,
- (ii) videotape recording required,
- (iii) manner in which replay session was conducted,
- (iv) recording did not highlight the behaviours being practised,
- (v) inability to view, or insufficient concentration upon, teacher behaviours,
- (vi) inability to view, or insufficient concentration upon, pupil behaviours,
- (vii) technical quality of the recording,
- (viii) other (specify)

12. The evaluation instruments (sheets) were designed to help you plan and assess your microteaching, and to focus your attention upon the behaviours being practised before the teach lesson and during the replay session.

In this regard, how useful to you were these instruments?

- (i) very useful,
- (ii) fairly useful,
- (iii) not very useful,
- (iv) not at all useful.

Questions 13-16 to be answered by students who were provided with staff tutors

13. (You may underline more than one alternative)

Just prior to your audio only or videotape replay, and in association with your staff tutor, you

- (i) almost immediately asked for the replay,
- (ii) exchanged comments designed to set each other at ease,
- (iii) made a general, overall appraisal of the lesson,
- (iv) clarified the objective of the lesson,
- (v) clarified some details of subject matter,
- (vi) made specific comments designed to focus attention on certain aspects of the replay?

14. The direction (who said what, when) of the replay session was in the hands of

- (i) the staff tutor,
- (ii) the staff tutor, mainly,
- (iii) both staff tutor and student,
- (iv) the student, mainly,
- (v) the student

15. (Choose one alternative from each of (a), (b) and (c))

You found your staff tutor's comments to be

- (a) (i) specific,
(ii) general.
- (b) (i) critical and negative,
(ii) neutral,
(iii) reassuring,
(iv) encouraging.
- (c) (i) very helpful,
(ii) fairly helpful,
(iii) not very helpful,
(iv) not at all helpful.

16. What advice, if any, would you give your staff tutor in order that his comments might be more helpful?

17. What period of time did you spend in planning your reteach lesson?
- (i) approx. $\frac{1}{4}$ hour,
 - (ii) approx. $\frac{1}{2}$ hour
 - (iii) approx. $\frac{3}{4}$ hour
 - (iv) approx. 1 hour
 - (v) approx. $1\frac{1}{2}$ hours
 - (vi) more than 2 hours
18. The reteach lesson
- (i) followed lines very similar to the teach lesson,
 - (ii) practised, and attempted to improve upon the 'weaknesses' revealed in the teach lesson,
 - (iii) deliberately followed a different approach,
 - (iv) attempted to follow-up the staff tutor's suggestions,
 - (v) followed lines very similar to the teach lesson, different pupils providing a new experience.
19. How valuable was it to take part in a reteach lesson?
- (i) very valuable,
 - (ii) fairly valuable,
 - (iii) not very valuable,
 - (iv) not at all valuable.
20. How necessary do you regard the provision of a staff tutor for the reteach lesson?
- (i) essential,
 - (ii) useful,
 - (iii) dependent upon performance in teach lesson,
 - (iv) unnecessary.
21. The total teaching programme was made up of lectures, curriculum and theory seminars as well as the provision of microteaching experiences.
- Do you regard the provision of the microteaching component to be
- (i) worthwhile,
 - (ii) not worthwhile.
22. List the criteria which contributed to your answer to question 21.
23. Use the following pages to elaborate further on a response already given, or to comment on a relevant issue not already raised in the previous questions.

APPENDIX G

QUESTIONNAIRE TO STAFF TUTORS

AUTUMN SEMESTER 1972

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONEDUCATION 13, AUTUMN SEMESTER, 1972

Questionnaire:

Over the last six weeks, two different programmes have been given for that part of the Education 13 course concerned with questioning behaviours.

Students taking the programmes and staff participating in the programmes are best placed to offer comments regarding the effectiveness, strengths, and weaknesses of the work. We ask you, therefore, to complete this questionnaire.

Following the analysis of responses from both students and staff involved in the programme, a report will be written, and a copy forwarded to you next semester.

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONEDUCATION 13, AUTUMN SEMESTER, 1972QUESTIONNAIRE: STAFF TUTORS

Information is sought relevant to that section of the Education 13 course concerned with questioning behaviours.

Candid, thoughtful responses would be much appreciated.

All responses will be treated as highly confidential.

Tutors will be well aware that they were responsible for some students taking the Stirling programme, and others taking the Alternative programme.

You are asked, therefore, to respond to many of the following questions twice. The first response represents your answer to the question in regard to the Stirling students, and the second response represents your answer in regard to the Alternative course students.

The two columns beside the questions represent the two teaching programmes. Indicate your response to a question by placing a tick (✓) in the appropriate column opposite the response alternative which corresponds most closely to your own opinion. Certain other questions will invite you to indicate more than a single pair of responses, or to offer concise comments concerning a particular issue.

It is realised that your opinion may be derived from contact with a fairly small sample of one or other student group. You are requested to offer an opinion wherever possible, but should you feel unable to do so, please indicate this fact alongside the question.

At the conclusion an opportunity is provided for you to offer further comment in support of your viewpoint on any particular question. In addition, you may wish to focus upon an issue not already raised by the questionnaire.

1. In the Education 13 course, some tutors have only a peripheral involvement in the details of the work undertaken. It is possible, therefore, that tutors depend upon the printed lecture handouts (Stirling and/or Alternative course) to clarify the course objectives and the behaviour expected from students taking the programme.

How valuable have you found these handouts in the following respects?

- (a) clear definition of the particular behaviours to be practised

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable
- (vi) no comment
- (vii) other (please specify)

- (b) explanation of the relevance and purposes of the behaviour in teaching

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable
- (vi) no comment
- (vii) other (please specify)

- (c) provision of practice for the students on written examples, in identifying the behaviour

- (i) very valuable
- (ii) fairly valuable
- (iii) not very valuable
- (iv) not at all valuable
- (v) not applicable
- (vi) no comment
- (vii) other (please specify)

STIRLING	ALTERNATIVE

- (d) provision of practice for the students, based on stimulus material, in writing examples of the particular behaviour
- (i) very valuable
 - (ii) fairly valuable
 - (iii) not very valuable
 - (iv) not at all valuable
 - (v) not applicable
 - (vi) no comment
 - (vii) other (please specify)
- (e) provision for the students of written transcripts of 'model' lessons giving examples of the use of the behaviour in the classroom
- (i) very valuable
 - (ii) fairly valuable
 - (iii) not very valuable
 - (iv) not at all valuable
 - (v) not applicable
 - (vi) no comment
 - (vii) other (please specify)

STIRLING	ALTERNATIVE

2. (You may select more than one alternative)

Many of the questioning behaviours were specified in close association with the categories of Bloom's "Taxonomy of Educational Objectives" i.e. knowledge, comprehension, application, analysis, synthesis.

- (a) For the STUDENTS, it would be your opinion that this approach
- (i) provided a clarification of ideas concerning the behaviour
 - (ii) introduced an unrealistic element regarding application to the classroom.
 - (iii) provided neither a positive nor a negative influence.
 - (iv) assisted in establishing the purpose and relevance of the behaviour.
 - (v) dissected the ideas to the extent that the concept of teaching was lost.
 - (vi) other (please specify)
- (b) For YOU, the TUTOR, this approach
- (i) provided a clarification of ideas concerning the behaviour.
 - (ii) introduced an unrealistic element regarding application to the classroom.
 - (iii) provided neither a positive nor a negative influence.
 - (iv) assisted in establishing the purpose and relevance of the behaviour.
 - (v) dissected the ideas to the extent that the concept of teaching was lost.
 - (vi) other (please specify)

STIRLING	ALTERNATIVE

3. In preparation for the replay session with the students, what proportion of your planning time was spent on a general reading of the 'printed handouts' to clarify the aims of the 'teach' session, and what proportion on a study of the assessment schedule appropriate to the behaviour being practised?
- (i) most time given to general reading of 'printed handouts'
 - (ii) about the same time on each
 - (iii) most time given to a study of the assessment schedule
4. (a) During replay sessions did the STUDENTS experience difficulty in focussing attention upon the behaviours being practised?
- (i) never
 - (ii) rarely
 - (iii) sometimes
 - (iv) frequently
 - (v) always
- (b) During replay sessions did YOU experience difficulty in focussing attention upon the behaviours being practised?
- (i) never
 - (ii) rarely
 - (iii) sometimes
 - (iv) frequently
 - (v) always

STIRLING	ALTERNATIVE

5. (You may select more than one alternative)
 If your answer to question 4 was (ii), (iii), (iv) or (v) which of the following contributed significantly to this difficulty?
- (i) Behaviours were not clearly defined.
 - (ii) Behaviours cited were of doubtful relevance to classroom teaching.
 - (iii) You, as tutor, did not have a clear idea of the behaviour to be practised.
 - (iv) The students did not appear to have a clear idea of the behaviour to be practised.
 - (v) The students' notions of the behaviour to be practised needed re-alignment when considered against the 'printed handout' statements.
 - (vi) The behaviour could not be separated from other aspects of teaching.
 - (vii) The time available for the lesson was too short to allow the students to practise the behaviours.
 - (viii) Response of pupils failed to provide the students with a reasonable opportunity to practise the behaviours.
 - (ix) The subject matter chosen by the student was inappropriate for the behaviour practised.
 - (x) Other (please specify)

STIRLING		ALTERNATIVE	
STUDENT	TUTOR	STUDENT	TUTOR

	STIRLING	ALTERNATIVE
<p>6. (You may select more than one alternative)</p> <p>Which of the following describe the procedure adopted during replay sessions?</p> <p>(i) Actual replay proceeded with little or no comment.</p> <p>(ii) Aspects of the lesson were discussed as they occurred.</p> <p>(iii) You, as tutor, made use of the assessment schedule.</p> <p>(iv) Students used the assessment schedule.</p> <p>(v) You, as tutor, noted points for subsequent discussion.</p> <p>(vi) Students noted points for subsequent discussion.</p> <p>(vii) Other (please specify)</p>		
<p>7. (You may select more than one alternative)</p> <p>Significant aspects of appraisal during or following the replay of the lesson concerned</p> <p>(i) the 'strengths' (appropriate behaviour) of the lesson.</p> <p>(ii) the 'weaknesses' (inappropriate behaviour) of the lesson.</p> <p>(iii) subject matter (content).</p> <p>(iv) questioning abilities.</p> <p>(v) other teaching activities.</p> <p>(vi) planning the reteach lesson.</p> <p>(vii) other (please specify)</p>		

8. Some replay sessions centred around an audio tape recording; for others a videotape recording was available.

It would be helpful if you would make specific comment regarding any ways in which your approach to the replay session was affected by the use of either audiotape or the videotape record in the replay session.

These comments should apply only to the practice of the questioning behaviours.

	STIRLING	ALTERNATIVE
<p>9. The assessment schedules were designed to focus attention upon the behaviours being practised before the teach lesson and during replay sessions.</p> <p>In this regard, how useful to you were these instruments?</p> <p>(i) very useful (ii) fairly useful (iii) not very useful (iv) not at all useful (v) no comment (vi) other (please specify)</p>		
<p>10. What advice, if any, would you suggest be given to students in order that maximum benefit be derived from the replay sessions?</p>		
<p>11. How valuable was it for the students to take part in a reteach lesson?</p> <p>(i) valuable for all students (ii) valuable for most students (iii) valuable for some students (iv) not valuable for any students (v) other (please specify)</p>		
<p>12. The reteach lesson should</p> <p>(i) follow lines very similar to the teach lesson.</p> <p>(ii) provide further practice in an attempt to improve upon the 'weaknesses' revealed in the teach lesson.</p> <p>(iii) deliberately follow a different approach.</p> <p>(iv) attempt to follow-up the tutor's suggestions.</p> <p>(v) follow lines very similar to the teach lesson, different pupils providing a new experience.</p> <p>(vi) other (please specify)</p>		

13. How necessary do you regard the provision of a tutor for the reteach lesson?

- (i) essential
- (ii) useful
- (iii) dependent upon performance
in teach lesson
- (iv) unnecessary

STIRLING	ALTERNATIVE

14. Two separate teaching programmes (Stirling/Alternative) have been offered in regard to the questioning behaviours. These programmes attempted to assist the students achieve similar objectives (see 'printed handouts').

It would be helpful if you would make specific comments regarding your appraisal of the two programmes, particularly emphasizing noted differences in students' behaviours which you believe might be attributed to one or other teaching programme.

15. The total teaching programme was made up of lectures, curriculum and theory seminars as well as the provision of microteaching experiences.

Do you regard the provision of the microteaching component to be

- (a) not worthwhile
- (b) worthwhile, and should continue much as at present
- (c) worthwhile, to the extent that more time should be devoted to it
- (d) worthwhile, to the extent that more time should be devoted to it at the expense of the lecture programme
- (e) worthwhile, to the extent that more time should be devoted to it at the expense of the curriculum seminar programme
- (f) worthwhile, to the extent that more time should be devoted to it at the expense of the theory seminar programme
- (g) worthwhile, but less time should be devoted to it
- (h) worthwhile, but less time should be devoted to it and more time given to

 (please specify)

STIRLING	ALTERNATIVE

16. List the criteria which contributed to your answer to question 15.

17. Do you have any comments to make regarding desirable modifications of the Stirling programme or the Alternative programme, or suggestions concerning a revised course structure which might include elements of both the Stirling and Alternative programmes?

Use the following pages to elaborate further on a response already given, or to comment on a relevant issue not already raised in the previous questions.

APPENDIX H

QUESTIONNAIRE TO STUDENTS

SPRING SEMESTER 1973

UNIVERSITY OF STIRLING

DEPARTMENT OF EDUCATION

PRIMARY TEACHING PRACTICE 1973 - QUESTIONNAIRE

During the teaching practice just completed, you were given the opportunity to practise, during a ten-minute period, in the classroom, questioning abilities which you had previously practised in microteaching.

Giving supporting reasons whenever possible, indicate the ways in which the classroom situation extended and/or limited your attempt to practise these abilities.

APPENDIX I
COMPUTER PROGRAMME FOR
ANALYSIS OF RESULTS,
SPRING SEMESTER POPULATION

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5511 LIST AC2
C PROGRAM ANYCON C 0001000019
C ANALYSIS OF VARIANCE FOR 2 FACTOR EXPERIMENT WITH SIMPLE CONTROL GROUPS IN C 0001000012
C EQUAL NUMBERED MEANS C 0001000015
C BASED ON NINER SECTION 0.2.2 AMENDED BY R. J. WHITE TO INCLUDE CASE OF UN C 0001000015
C EQUAL NO 10TH JANUARY 1975. C 0001000015
----- START OF SEGMENT 002
DIMENSION N(6,6),C(20),N(6,6,20),M(6,20),COL(6,20),CELL(6,6,20),F(12) C 0021000010
1) F(24) C 0021000010
DIMENSION CM(20),CS(20) C 0021000010
READ 1,NSET5 C 0021000010
----- FIB IS 0006 LONG
DO 10 NSET=1,NSET5 C 0021000012
READ 1,NP,NQ,MP C 0021000010
FORMAT(20I4) C 0021001312
READ 1,NQ,(NJK(J,K),J=1,NP),K=1,NO) C 0021001312
NPQNPNQ C 0021002712
PRINT 2,NP,NQ,MP C 0021002815
----- FIB IS 0006 LONG
2 FORMAT(1X,20I4) C 0021003212
PRINT 2,NQ,(NJK(J,K),J=1,NP),K=1,NO) C 0021003212
30.0 C 0021004512
NT=0 C 0021004610
DO 3 K=1,NG C 0021004614
DU 3 M=1,MP C 0021004810
N=NT+NJK(J,K) C 0021004910
S=S(1)/NJK(J,K) C 0021004912
READ 4,F C 0021005411
4 FORMAT(12A6) C 0021005412
PRINT 30,F C 0021005812
30 FORMAT(1X,12A6) C 0021006212
DU 5 M=1,MP C 0021006212
CM(M)=0.0 C 0021006310
CS(M)=0.0 C 0021006413
2 CONTINUE C 0021006610
N=N/NO C 0021006811
PRINT 12,NP,NQ,MP,NO C 0021006913
13 FORMAT(1X,14,2F10.4) C 0021007312
CONS=1/(RN+NP) C 0021007312
CONST=1/NG+CONS C 0021007510
NQ=RN+NQ C 0021007610
RNP=RN+NP C 0021007810
C SET OF C 0021007912
NDFC=1 C 0021007912
NDFAMP=1 C 0021007A10
NDFM=NO-1 C 0021007B12
NDFAB=NDFAMP+NDFM C 0021007C18
NDFN=NT+NPQ+NO-1 C 0021007E11
C READ SCORES FOR CONTROL GROUPS C 0021008013
DO 7 N=1,NO C 0021008013
READ 7,C(M),M=1,MM) C 0021008210
FORMAT(1X,20F3.0) C 0021008F12
C(1)=C(1)+C(2) C 0021008F12
C(2)=C(3)+C(7) C 0021009111
C(5)=C(5)+C(2) C 0021009113
C(10)=C(10)+C(16) C 0021009513
C(13)=C(13)+C(18) C 0021009714

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C(11)=C(11)+C(14) C 0021009915
C(14)=C(14)+C(15) C 0021009910
C(8)=C(8)+C(9)+C(14) C 0021009E11
PRINT 37,C(M),M=1,MM) C 002100A111
DO 6 M=1,MM C 002100A012
CM(M)=CM(M)+C(M) C 002100A610
CS(M)=CS(M)+C(M)+C(M) C 002100A815
CONTINUE C 002100B710
CONTINUE C 002100B911
DO 8 M=1,MM C 002100BA10
RMEAN=CM(M)/NO C 002100BC10
CS(M)=CS(M)-RMEAN+CM(M) C 002100BF12
CM(M)=RMEAN C 002100C110
PRINT 9,M,CM(M),CS(M) C 002100CC12
8 FORMAT(1X,12,2(5X,F12.4)) C 002100CC12
CONTINUE C 002100CC12
READ 4,ICHE C 002100CE13
IF(ICHE.EQ.0)GOTO12 C 002100D312
PRINT 11,M,MM,ICHE C 002100D71A
FORMAT(17H = END CELL ERROR 21=,1X,A6) C 002100E112
GOTO12 C 002100E112
CONTINUE C 002100E115
DO 12 M=1,MM C 002100E115
DO 14 K=1,NO C 002100E310
EULSK(M)=0.0 C 002100E810
DO 14 J=1,MP C 002100E614
CELL(J,K,M)=0.0 C 002100E810
DO 15 J=1,MP C 002100F010
RUMS(J,M)=0.0 C 002100F110
CONTINUE C 002100F315
C READ IN DATA BY COLUMN C 002100F810
DO 21 K=1,NO C 002100F810
DO 21 J=1,MP C 002100F910
N=NJK(J,K) C 002100FA10
C READ DATA FOR CELL(J,K) C 002100FC1A
DO 17 I=1,NI C 002100FC1A
READ 17,C(M),M=1,MM) C 002100FE10
C(1)=C(1)+C(2) C 0021010012
C(2)=C(3)+C(7) C 0021010011
C(5)=C(5)+C(2) C 0021010F13
C(10)=C(10)+C(16) C 0021011113
C(13)=C(13)+C(18) C 0021011314
C(11)=C(11)+C(14) C 0021011315
C(14)=C(14)+C(15) C 0021011810
C(8)=C(8)+C(9)+C(14) C 0021011A11
DO 16 M=1,MM C 0021011011
CELL(J,K,M)=CELL(J,K,M)+C(M) C 0021011E10
N(NJK(J,K),M)=N(NJK(J,K),M)+C(M)+C(M) C 0021012310
CONTINUE C 0021012811
CONTINUE C 0021012812
C CHECK CARD FOLLOWING CELL(J,K) C 0021012D13
READ 4,ICHE C 0021012D13
IF(ICHE.EQ.0)GOTO18 C 0021013412
PRINT 11,J,K,ICHE C 0021013614
GOTO10 C 0021014012
CONTINUE C 0021014015
DO 22 M=1,MM C 0021014015
CELL(J,K,M)=CELL(J,K,M)/NJK(J,K) C 0021014210
CONTINUE C 0021014A12

```



```

20 DO 35 N=1,MM
   PRINT 20,M
   FORMAT(20,INDEPENDENT VARIABLE 122)
   PRINT 23
23 FORMAT(11M CELL MEANS )
   PRINT 24,(K,K=1,NQ)
24 FORMAT(52,10(6X,12.4X))
   LO 26 J=1,NP
   PRINT 25,((CELL(J,K,M),K=1,NM))
25 FORMAT(1X,10(2X,10F12.4))
26 CONTINUE
   ON 31 J=1,NP
   SIG=0.0
   DO 30 K=1,NG
29 SIG=SIG+CELL(J,K,M)
   RM(J,M)=SIG/NO
   PRINT 27
27 FORMAT(11M ROW MEANS )
   PRINT 28,(J,J=1,NP)
   PRINT 28,(RM(J,M),J=1,NP)
28 FORMAT(52,10F12.4)
   GM=0.0
   DO 32 K=1,NG
   SIG=0.0
   DO 33 J=1,NP
33 SIG=SIG+CELL(J,K,M)
   CL(J,K)=SIG/NP
32 GM=GM+COL(K,M)
   GM=GM/MQ
   PRINT 29
29 FORMAT(11M COLUMN MEANS )
   PRINT 29,(K,K=1,NG)
   PRINT 29,(CL(K,M),K=1,NG)
   PRINT 30,GM
30 FORMAT(11M GRAND MEAN (5X,112.4))
   TEM=GM/MQ
   SSC=TEM/SSQ
   TEN=0.0
   DO 38 J=1,NP
   TEMP=RM(J,M)*GM
   TEM=TEM+TEMP*TEMP
   SSA=RMQ*TEM
   NIIM=0.0
   TEJ=0.0
   TEK=0.0
   DO 39 K=1,NG
   IEMP=COL(K,M)*GM
   TEK=TEK+IEMP*TEMP
   DO 32 J=1,NP
   TEP=CELL(J,K,M)*RM(J,M)*TEMP
   NIIM=NIIM+TEP*TEP
39 CONTINUE
   SSA=RMQ*TEM
   SSAB=RMQ*TEJ
   SSN=NIIM+CSQ(M)
   SET MS
   CMS=SSC/NDFC
   AMS=SSA/NDEA

```

```

C 0021014E14
C 0021015010
C 0021015A12
C 0021015612
C 0021015A12
C 0021015A12
C 0021016512
C 0021016512
C 0021016A10
C 0021017512
C 0021017512
C 0021017713
C 0021017910
C 0021017914
C 0021017A10
C 0021018112
C 0021018A15
C 0021018B12
C 0021018B12
C 0021018B12
C 0021019612
C 002101A312
C 002101A312
C 002101A810
C 002101A510
C 002101A51A
C 002101A710
C 002101A012
C 002101B010
C 002101B810
C 002101B712
C 002101B812
C 002101B812
C 002101CA12
C 002101D312
C 002101DA12
C 002101DA12
C 002101DC12
C 002101D014
C 002101DE12
C 002101DF10
C 002101E211
C 002101E610
C 002101E712
C 002101E810
C 002101E814
C 002101E912
C 002101EA10
C 002101ED11
C 002101EE15
C 002101F010
C 002101FA13
C 002101F811
C 0021020512
C 0021020914
C 0021020B10
C 0021020C12
C 0021020E12
C 0021020E12
C 0021020F1A

```

```

6 BMS=SSB/NDFB
  ABS=SSAB/NDFAB
  QMS=SSM/NDFM
  SET F
  FC=CMS/MMS
  FAMS=MMS
  FB=BMS/MMS
  FAB=ABMS/MMS
6 PRINT ANOVA TABLE
40 PRINT 40
  FORMAT(11M SOURCE,12X,2MSS,12X,2MDF,12X,2MMS,12X,1MF /)
  PRINT 41,SSC,NDFC,CMS,FC
41 FORMAT(6M CONTROL,4X,12.4,9(8X,10.2X),F12.4,2X,F12.4)
  PRINT 42,SSA,NDFAB,AMS,FA
42 FORMAT(7M A,5X,F12.4,8X,10.2X,F12.4,2X,F12.4)
  PRINT 43,SSB,NDFB,BMS,FB
43 FORMAT(7M B,5X,F12.4,8X,10.2X,F12.4,2X,F12.4)
  PRINT 44,SSAB,NDFAB,ABS,FA
44 FORMAT(7M AB,5X,F12.4,8X,10.2X,F12.4,2X,F12.4)
  PRINT 45,SSM,NDFM,MMS
45 FORMAT(11M WITHINCELL,1X,F12.4,8X,10.2X,F12.4)
46 CONTINUE
47 CONTINUE
48 STOP
END

```

```

C 0021021110
C 0021021212
C 0021021314
C 0021021510
C 0021021510
C 0021021612
C 0021021714
C 0021021910
C 0021021A12
C 0021021A12
C 0021021A12
C 0021021E12
C 0021021E12
C 0021022912
C 0021022912
C 0021023A12
C 0021023A12
C 0021023F12
C 0021023F12
C 0021024A12
C 0021024A12
C 0021025A12
C 0021025A12
C 0021025A11
C 0021025B14
C 0021025B11

```

FORMAT SEGMENT 003 IS 0030 LONG.
 FORMAT SEGMENT 002 IS 0081 LONG.
 WARNING ONLY.
 WARNING ONLY.
 SEGMENT 002 IS 029B LONG

START OF SEGMENT 002
 SEGMENT 007 IS 001E LONG

ERR08 2171 NJM VARIABLE POSSIBLY UNDEFINED
 ERR08 2171 F VARIABLE POSSIBLY UNDEFINED

NO ERRORS DETECTED. NUMBER OF CARDS = 197.
 COMPILATION TIME = 16 SECONDS ELAPSED. 3.74 SECONDS PROCESSING.
 02 STACK SIZE = 15 WORDS. FILESIZE = 140 WORDS. ESTIMATED CORE STORAGE REQUIREMENT = 2779 WORDS.
 TOTAL PROGRAM CODE = 743 WORDS. ARRAY STORAGE = 1000 WORDS.
 NUMBER OF PROGRAM SEGMENTS = 7. NUMBER OF DISK SEGMENTS = 0.
 PROGRAM CODE FILE = NJB/ANVCON. COMPILER COMPILED ON 12/18/74

APPENDIX J

COMPUTER PROGRAMME FOR

ANALYSIS OF RESULTS,

AUTUMN SEMESTER POPULATION

```

PROGRAM AVAR2D3
C     AVAR2D3 MODIFIED TO STORE SEVERAL VARIABLES FROM EACH RECORD
C     JANUARY, 1975, NJUCS3Y,
C     DATA DECK THE SAME FOR EQUAL CELLS AND UNEQUAL CELLS,
C
C     N (NUMBER IN CELL), N CARDS, ECFL (END OF CELL MARK),
C     DOUBLE OR TRIPLE ANALYSIS OF VARIANCE
C     FOLLOWING VEHLMAN, P257
C     PARAMETER CONTROL CARD FIELDS
C     COLS 1-5 NUMBER OF LEVELS FOR FACTOR A (MAX 10)
C     6-10 NUMBER OF LEVELS FOR FACTOR B (MAX 10)
C     COLS 11-15 NUMBER OF LEVELS FOR FACTOR C (MAX 10)
C     SET=1 FOR DOUBLE CLASSIFICATION
C     COLS 16-20 NUMBER OF SUBJECTS PER ABC CELL IF ALL CELL N ARE EQUAL
C     FOR UNEQUAL CELL N SET=9999 AND ADD A GROUP CONTROL CARD IN FRONT OF
C     EACH CELL-SET OF DATA CARDS (COLS 1-5 IS N FOR CELL)
C     COLS 21-25 SET=0001 IF ZERO/BLANK SCORES TO BE TREATED AS
C     MISSING DATA IF ZERO SCORES VALID, LEAVE BLANK
C     EACH SUBJECT IS TO BE ON A SEPERATE DATA CARD
C     ORDER OF CELLS IN DATA IS A1B1C1,A1B1C2,...,A1B2C1,ETC

```

```

00002     DIMENSION MF(40), S(10), DF(10), F(10), P(10), A(10), B(10), C(10),
00003     2 AN(10,10), AC(10,10), BC(10,10,10), GN(10,10,10), ABC(10,10,10)
00004     5 CALL CDS(KF,NA,NB,NC,NS,MZ)SZ4=MZ
C     STORE DATA
00006     READ 20,NSETS
00007     MAR=N
00008     DO 861 I=1,NA
00009     DO 861 J=1,NB
00010     DO 861 K=1,NC
00011     READ 20,N
00012     MAR(I,J,K)=N
00013     DO 862 I1=1,N
00014     MAR=MAR+1
00015     READ KF,(ARHAY(MAR,NSET),NSET=1,NSETS)
C     *****HIGH PATTEN 10/4/75
00016     ARRAY(MAR,1)=ARRAY(MAR,1)+ARRAY(MAR,2)
00017     ARRAY(MAR,2)=ARRAY(MAR,6)+ARRAY(MAR,7)
00018     ARRAY(MAR,5)=ARRAY(MAR,5)+ARRAY(MAR,2)
00019     ARRAY(MAR,10)=ARRAY(MAR,10)+ARRAY(MAR,16)
00020     ARRAY(MAR,13)=ARRAY(MAR,13)+ARRAY(MAR,16)
00021     ARRAY(MAR,11)=ARRAY(MAR,11)+ARRAY(MAR,12)
00022     ARRAY(MAR,14)=ARRAY(MAR,14)+ARRAY(MAR,15)
00023     ARRAY(MAR,8)=ARRAY(MAR,8)+ARRAY(MAR,9)+ARRAY(MAR,14)
C     *****
00024     PRINT 874,(ARRAY(MAR,NSET),NSET=1,NSETS)
00025     874 FORMAT(1X,20F6.0)
00026     862 CONTINUE
00027     READ 863,ICHE
00028     IF (ICHE.EQ.4)GOTO866
00029     PRINT 864,I,J,K,N,ICHE
00030     864 FORMAT(17H * END CELL ERROR 414,1X,A4)
00031     863 FORMAT(A4)
00032     GOTO865
00033     866 CONTINUE
00034     861 CONTINUE
00035     DO 860 NSET=1,NSETS
00036     ND=10
00037     NT=NA*NB*NC
C     ZERO ACCUMULATORS

```

```

00038     N=NS
00039     Y=REC=VAR=0,
00040     DO 10 I=1,10
00041     S(I)=A(I)+B(I)+C(I)=0,
00042     DO 10 J=1,10
00043     10 AB(I,J)=AC(I,J)+BC(I,J)=0,
C     INPUT DATA, CHECKS, ACCUMULATE SUMS
00044     MAR=N
00045     DO 80 I=1,NA
00046     DO 80 J=1,NB
00047     DO 80 K=1,NC
00048     N=MAR(I,J,K)
00049     20 FORMAT(15)
00050     PRINT 20,N
00051     25 ABC(I,J,K)=SQ=1.
00052     GN(I,J,K)=N
00053     DO 40 I1=1,N
00054     MAR=MAR+1
00055     X=ARRAY(MAR,NSET)
00056     PRINT 890,X
00057     890 FORMAT(1X,E11.4)
00058     IF (ZM.EQ.1)GAND,X,EQ.0.0)30,35
00059     30 GN(I,J,K)=GN(I,J,K)+1
00060     35 ABC(I,J,K)=ABC(I,J,K)+X
00061     40 SQ=SQ+X*X
00062     IF(GN(I,J,K).GT.0.0)55,45
00063     45 PRINT 50,I,J,K
00064     50 FORMAT(16H1ND DATA IN CELL,3(15))
00065     STOP
C     FIND(1/CELL N), VARIANCE, MEAN
00066     55 Y=RYAR=(SQ-(ABC(I,J,K)**2)/GN(I,J,K))
00067     REC=REC+1,0/GN(I,J,K)
00068     ABC(I,J,K)=ABC(I,J,K)/GN(I,J,K)
00069     60 T=GN(I,J,K)
C     COMPUTE 1-SCORE=PER=CELL ANALYSIS AND CELL MEANS.
00070     DO 65 I=1,NA
00071     DO 65 J=1,NB
00072     DO 65 K=1,NC
00073     S(2)=S(2)+ABC(I,J,K)**2
00074     A(I)=A(I)+ABC(I,J,K)
00075     B(J)=B(J)+ABC(I,J,K)
00076     C(K)=C(K)+ABC(I,J,K)
00077     AB(I,J)+AB(I,J)+ABC(I,J,K)
00078     AC(I,K)=AC(I,K)+ABC(I,J,K)
00079     65 BC(J,K)=BC(J,K)+ABC(I,J,K)
C     SET PARAMETERS AND DEGREES OF FREEDOM
00080     TN=NT+AN+NA+RN+NB+CN+NC
00081     DF(1)=T-1, S DF(2)=TN-1,
00082     DF(3)=AN-1, S DF(4)=BN-1,
00083     DF(5)=CN-1, S DF(6)=DF(3)+DF(4)
00084     DF(7)=DF(3)+DF(5) S DF(8)=DF(4)+DF(5)
00085     DF(9)=DF(3)+DF(8) S DF(10)=T-TN
00086     DO 75 I=1,NA
00087     S(3)=S(3)+A(I)**2/(BN*CN)
00088     A(I)=A(I)/(BN*CN)
00089     DO 70 J=1,NB
00090     S(6)=S(6)+AB(I,J)**2/CN
00091     70 AB(I,J)=AB(I,J)/CN
00092     DO 75 K=1,NC
00093     S(7)=S(7)+AC(I,K)**2/BN
00094     75 AC(I,K)=AC(I,K)/BN
00095     DO 80 J=1,NB

```

```

00104      S(4)=S(4)+H(J)*2/(AN*CN)
00105      R(J)=R(J)/(A1+CN)
00106      DO 80 K=1,NC
00107      S(1)=S(1)+HC(J,K)*2/A1
00108      DO DC(J,K)=DC(J,K)/A1
00109      CF=0.
00110      DO 85 M=1,MC
00111      CF=CF+C(K)
00112      S(5)=S(5)+C(K)*2/(AN*BN)
00113      C(K)=C(K)/(AN*BN)
00114      CF=CF/CF*TN
C ADJUST SUMS OF SQUARES, COMPLETE COMPUTATION
00115      DO 90 I=2,9
00116      90 S(I)=(S(I)-CF)*TN/HC
00117      S(1)=S(2)+VAR
00118      S(6)=S(6)+S(1)-S(4)
00119      S(7)=S(7)+S(3)-S(5)
00120      S(8)=S(8)+S(4)-S(5)
00121      S(9)=S(2)+S(3)+S(4)+S(5)+S(6)-S(7)+S(8)
00122      S(10)=VAR
C CONVERT TO MEAN SQUARES
00123      DO 100 I=1,10
00124      IF (DF(I).GT.0.)95 ,100
00125      95 S(I)=S(I)/DF(I)
00126      100 CONTINUE
C COMPUTE F RATIOS AND PROBABILITIES
00127      DO 105 I=3,9
00128      F(I)=S(I)/S(10)
00129      105 P(I)=PHOD(F(DF(I),DF(10),F(I)))
C PRINT SOURCE TABLE AND RELEVANT CELL MEANS
00130      PRINT 110, (S(I),DF(I),I=1,3),F(3),P(3),S(4),DF(4),F(4),P(4)
00131      110 FORMAT(///21H ANALYSIS OF VARIANCE,///7H SOURCE,16X,4HH,S,
2 3X,4HD,S,4X,2HF=RATIO,8X,1MP//4H--TOTAL,F21,3,E10,0//
3 8H BETWEEN,F10,3,F10,0/3X,1HA,F23,3,F10,0,2F12,4/3X,1HB,
4 F23,3,F10,0,2F12,4)
IF (NC.GT.1)115,125
00132      115 PRINT 120,S(5),DF(5),F(5),P(5)
00133      120 FORMAT(3X,1MC,F23,3,F10,0,2F12,4)
00134      125 PRINT 130,S(6),DF(6),F(6),P(6)
00135      130 FORMAT(3X,2HA3,F22,3,F10,0,2F12,4)
00136      IF (NC.GT.1)135,145
00137      135 PRINT 140,(S(I),DF(I),F(I),P(I),I=7,9)
00138      140 FORMAT(3X,2HAC,F22,3,F10,0,2F12,4/3X,2HBC,F22,3,F10,0,
2 2F12,4/3X,3HAPC,F21,3,F10,0,2F12,4)
00139      145 PRINT 150, S(10), DF(10)
150 FORMAT(//7H WITHIN,F20,3,F10,0,///23H MEANS FOR ALL EFFECTS,)
CALL PRINTARR(A,NA,1,4HA MA,2HIN,ND)
00141      CALL PRINTARR(B,NB,1,4HB MA,2HIN,ND)
00142      IF (NC.GT.1)155,160
00143      155 CALL PRINTARR(C,NC,1,4HC MA,2HIN,ND)
00144      160 CALL PRINTARR(AB,NA,NB,4HA BY,2H B,ND)
00145      IF (NC.EQ.1)165,165
00146      165 CALL PRINTARR(AC,NA,NC,4HA BY,2H C,ND)
00147      CALL PRINTARR(BC,NB,NC,4HB BY,2H C,ND)
00148      PRINT 170
00149      170 FORMAT (//31H CELL MEANS, BLOCKS = C LEVELS,)
00150      DO 180 K=1,NC
00151      DO 175 I=1,NA
00152      DO 175 J=1,NB
00153      175 AB(I,J)=ABC(I,J,K)
00154      180 CALL PRINTARR(AB,NA,NB,2HAB,1H ,ND)
00155      185 IF (2M .EQ.0.01210,190

```

```

C PRINT MATRIX OF N-S PER CELL
00156      190 PRINT 195
00157      195 FORMAT (//38H SUBJECTS PER CELL, BLOCKS = C LEVELS,)
DO 205 K=1,NC
00158      DO 200 I=1,NA
00159      DO 200 J=1,NB
00160      200 AB(I,J)=GN(I,J,K)
00161      205 CALL PRINTARR(AB,NA,NB,2HAB,1H ,ND)
00162      210 CONTINUE
00163      260 CONTINUE
00164      DO 10 5
00165      865 CONTINUE
00166      END

```

NULL STATEMENT NUMBERS
25

FUNCTIONS AND SUBROUTINES					
CCDS	Q10STR	Q10SRR	Q10EXR	PROBF	PRINTARR
ERRORS IN .AVAR208	LTH=	12512	COMMON =	0	DATA =

```

00001      SUBROUTINE PRINTARH (X,N,M,KH1,KH2,ND)
C
C PRINT A MATRIX OR VECTOR IN 10-COLUMN PARTITIONS
C X = ARRAY TO BE OUTPUT
C N = NUMBER OF ROWS (OR ELEMENTS) OF X TO BE PRINTED
C M = NUMBER OF COLUMNS OF X TO BE PRINTED, M = 1 IF X A VECTOR
C KH1,KH2 = NAME OF ARRAY FOR OUTPUT HEADING, MCLLERITH CONSTANTS
C IN THE CALL STATEMENT, MAX = 4 CHARACTERS EACH
C ND = NUMBER OF ROWS (OR ELEMENTS) DIMENSIONED FOR X IN THE
C CALLING PROGRAM
C
00002      DIMENSION X(10,10)
00003      IF(4.GT.1)GO,21
00004      21 PRINT 15
00005      DO 10 I=1,N,10
00006      J=MIN0(I+9,N)
00007      PRINT 5,KH1,KH2,(X(K,K1,J)
00008      5 FORMAT(/X,2A4,10F11)
00009      10 PRINT 15,(X(K,1),K=1,J=1
00010      15 FORMAT(10X,10F11,4)
00011      RETURN
00012      20 DO 25 K=1,M,10
00013      PRINT 15
00014      L=MIN0(K+9,M)
00015      PRINT 5,KH1,KH2,(J,J=K,L)
00016      DO 25 I=1,N
00017      25 PRINT 30,I,(X(I,J),J=K,L)
00018      30 FORMAT(/16,4X,10F11,4)
00019      RETURN
00020      END

```

FUNCTIONS AND SUBROUTINES
MIND

0 ERRORS IN PRINTARH LTH= 232 COMMON = 0 DATA = 0

MONASH UNIVERSITY FORTRAN

```

00001      SUBROUTINE CCDS (KF,KI,KJ,KK,KL,KM)
C
C READS AND PRINTS TITLE,PARAMETER,AND FORMAT CONTROL CARDS
C KF = VECTOR HOLDING VARIABLE FORMAT ON RETURN
C KI,KJ,KK,KL,KM = PARAMETER VALUES
C BLANK TITLE CARD YIELDX STOP
C
00002      DIMENSION KH(20),KF(40)
00003      READ 5,KH
00004      5 FORMAT(20A4)
00005      IF(KH(1).EQ.(KH(2))16,7
00006      6 STOP
00007      7 READ 10,KI,KJ,KK,KL,KM,KF
00008      10 FORMAT(5I5/20A4/20A4)
00009      PRINT 15,KH,KI,KJ,KK,KL,KM,KF
00010      15 FORMAT(14I,20A4, //11H PARAMETERS /13H COL 1=5 = ,15/
00011      2 13H COL 6=10 = ,15/13H COL11=15 = ,15/13H COL 16=20 = ,
00012      3 15/13H COL 21=25 = ,15//15H DATA FORMAT = , 20A4/1X,20A4)
00011      RETURN
00012      END

```

0 ERRORS IN CCDS LTH= 265 COMMON = 0 DATA = 0

```

00001      FUNCTION PROBF (DA,DB,FR)
00002      PRDF=1.0
00003      IF (DA*DB*FR .EQ. 0.0) 1,2
00004      1 RETJRN
00005      2 CONTINUE
00006      IF (FR.LT.1.0) 4,4
00007      4 A=DA
00008      B=DB
00009      F=FR
00010      GO TO 10
00011      5 A=DB
00012      B=DA
00013      F=1.0/FR
00014      10 AA=2.0/(9.0+A)
00015      BB=2.0/(9.0*B)
00016      Z=ABS(((1.0-0.3)* F**0.333333-1.0+AA)/SQRT(PB=F**0.666667*AA))
00017      IF (B.LT.4.0) 13,20
00018      15 Z = Z*(1.0 + 3.0* F**4 / B**3)
00019      20 PRDF = -0.5 * Z**41.0 - Z*(1.194854 - Z*(0.119104 - Z*(0.000344 -
00020      Z*(0.019527))))**4
00021      IF (FR .LT. 1.0) 25,30
00022      25 PRDF = 1.0 - PRDF
00023      30 CONTINUE
00024      RETJRN
00025      END

```

FUNCTIONS AND SUBROUTINES
ABS SORT 310EXR 310EXR1

0 ERRORS IN PROBF LYM= 284 COMMON = 0 DATA = 0
LOAD=56
RUN=60
COMPILATION TIME RAM 80M 449
UNUSED MEMORY 13623 (OCTAL)

APPENDIX K

SPRING SEMESTER 1972

ANOVA TABLES

(a) Teacher questioning behavioursCriterion behaviour:

Total knowledge and lower order synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	48.81	1		0.25	
2. Inter-personal feedback	329.20	1		1.67	
3. Technical feedback	299.87	1		1.52	
4. 2 x 3	154.58	1		0.78	
Within cell	22847.97	116	196.97		

Criterion behaviour:

Total comprehension, application, analysis and synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	506.69	1		5.58	<.05
2. Inter-personal feedback	305.87	1		3.37	
3. Technical feedback	101.61	1		1.12	
4. 2 x 3	309.39	1		3.41	
Within cell	10531.35	116	90.79		

Criterion behaviour:

Total analysis and synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	22.28	1		0.55	
2. Inter-personal feedback	46.30	1		1.13	
3. Technical feedback	19.26	1		0.47	
4. 2 x 3	1.84	1		0.05	
Within cell	4736.42	116	40.83		

Criterion behaviour:

Total analysis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	10.09	1		0.44	
2. Inter-personal feedback	0.02	1		0.00	
3. Technical feedback	13.77	1		0.60	
4. 2 x 3	0.57	1		0.03	
Within cell	2672.67	116	23.04		

Criterion behaviour:

Total synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	2.38	1		0.21	
2. Inter-personal feedback	44.29	1		3.86	
3. Technical feedback	0.46	1		0.04	
4. 2 x 3	0.36	1		0.03	
Within cell	1332.05	116	11.48		

(b) Pupil response behavioursCriterion behaviour:

Total original pupil responses

Source	SS	df	MS	F	P
1. Control vs all other groups	12.67	1		0.51	
2. Inter-personal feedback	25.57	1		1.03	
3. Technical feedback	24.24	1		0.98	
4. 2 x 3	16.37	1		0.66	
Within cell	2870.18	116	24.74		

Criterion behaviour:

Total pupil responses supported

Source	SS	df	MS	F	P
1. Control vs all other groups	8.36	1		0.96	
2. Inter-personal feedback	50.82	1		0.72	
3. Technical feedback	25.57	1		0.36	
4. 2 x 3	0.02	1		0.00	
Within cell	8234.98	116	70.99		

Criterion behaviour:

Total pupil responses original and supported

Source	SS	df	MS	F	P
1. Control vs all other groups	0.74	1		0.06	
2. Inter-personal feedback	0.01	1		0.00	
3. Technical feedback	3.21	1		0.27	
4. 2 x 3	3.39	1		0.28	
Within cell	1396.35	116	12.04		

Criterion behaviour:

Total analysis and synthesis questions followed by original pupil response

Source	SS	df	MS	F	P
1. Control vs all other groups	5.81	1		2.04	
2. Inter-personal feedback	10.56	1		3.71	
3. Technical feedback	5.90	1		2.08	
4. 2 x 3	0.81	1		0.29	
Within cell	329.76	116	2.84		

Criterion behaviour:

Total analysis and synthesis questions followed by pupil response supported

Source	SS	df	MS	F	P
1. Control vs all other groups	8.15	1		1.47	
2. Inter-personal feedback	0.11	1		0.01	
3. Technical feedback	0.05	1		0.00	
4. 2 x 3	7.70	1		0.40	
Within cell	2227.24	116	19.20		

Criterion behaviour:

Total analysis and synthesis questions followed by original and supported pupil responses

Source	SS	df	MS	F	P
1. Control vs all other groups	3.34	1		0.55	
2. Inter-personal feedback	3.42	1		0.56	
3. Technical feedback	3.01	1		0.49	
4. 2 x 3	5.58	1		0.92	
Within cell	709.51	116	6.12		

- (c) Follow-up behaviours subsequent to the asking of an initial teacher question or a response to such a question

Criterion behaviour:

Total occasions no opportunity given to pupils to respond to a teacher question

Source	SS	df	MS	F	P
1. Control vs all other groups	10.83	1		1.13	
2. Inter-personal feedback	0.01	1		0.00	
3. Technical feedback	29.47	1		3.07	
4. 2 x 3	3.04	1		0.32	
Within cell	1113.57	116	9.60		

Criterion behaviour:

Total occasions no pupil response offered to a teacher question

Source	SS	df	MS	F	P
1. Control vs all other groups	0.14	1		0.00	
2. Inter-personal feedback	6.11	1		0.17	
3. Technical feedback	1.32	1		0.04	
4. 2 x 3	0.00	1		0.00	
Within cell	4194.30	116	36.16		

Criterion behaviour:

Total teacher prompts

Source	SS	df	MS	F	P
1. Control vs all other groups	0.14	1		0.01	
2. Inter-personal feedback	4.00	1		0.37	
3. Technical feedback	0.91	1		0.08	
4. 2 x 3	17.51	1		1.61	
Within cell	1265.46	116	10.91		

Criterion behaviour:

Total teacher probes

Source	SS	df	MS	F	P
1. Control vs all other groups	24.26	1		1.64	
2. Inter-personal feedback	1.73	1		0.12	
3. Technical feedback	0.86	1		0.06	
4. 2 x 3	34.41	1		2.33	
Within cell	1711.57	116	14.75		

Criterion behaviour:

Analysis plus synthesis category probes

Source	SS	df	MS	F	P
1. Control vs all other groups	4.40	1		0.65	
2. Inter-personal feedback	1.40	1		0.21	
3. Technical feedback	3.42	1		0.51	
4. 2 x 3	3.33	1		0.49	
Within cell	783.78	116	6.76		

APPENDIX L
AUTUMN SEMESTER 1972
ANOVA TABLES

(a) Teacher questioning behavioursCriterion behaviour:

Total knowledge and lower order synthesis teacher questions

Source	MS	df	F	P
Total		60		
Between		7		
1. Programme	305.70	1	1.78	
2. Technical feedback	11.27	1	0.07	
3. Inter-personal feedback	11.99	1	0.07	
4. 1 x 2	396.80	1	2.31	
5. 1 x 3	0.00	1	0.00	
6. 2 x 3	226.46	1	1.32	
7. 1 x 2 x 3	161.73	1	0.94	
Within cell	171.62	53		

Criterion behaviour

Total comprehension, application, analysis and synthesis teacher questions

Source	MS	df	F	P
Total	91.24	60		
Between	119.96	7		
1. Programme	609.43	1	6.97	< .05
2. Technical feedback	47.22	1	.54	
3. Inter-personal feedback	0.73	1	.01	
4. 1 x 2	0.07	1	.00	
5. 1 x 3	22.23	1	.25	
6. 2 x 3	6.19	1	.07	
7. 1 x 2 x 3	153.87	1	1.76	
Within cell	87.45	53		

Criterion behaviour:

Total analysis and synthesis teacher questions

Source	MS	df	F	P
Total	42.65	60		
Between	99.79	7		
1. Programme	504.44	1	14.37	<01
2. Technical feedback	32.36	1	0.92	
3. Inter-personal feedback	1.53	1	0.04	
4. 1 x 2	74.76	1	2.13	
5. 1 x 3	82.16	1	2.34	
6. 2 x 3	0.79	1	0.02	
7. 1 x 2 x 3	2.51	1	0.07	
Within cell	35.10	53		

Criterion behaviour

Total analysis teacher questions

Source	MS	df	F	P
Total	30.22	60		
Between	45.67	7		
1. Programme	250.09	1	8.87	<01
2. Technical feedback	0.04	1	0.00	
3. Inter-personal feedback	7.85	1	0.28	
4. 1 x 2	34.78	1	1.23	
5. 1 x 3	21.26	1	0.75	
6. 2 x 3	0.04	1	0.00	
7. 1 x 2 x 3	5.68	1	0.20	
Within cell	28.18	53		

Criterion behaviour:

Total synthesis teacher questions

Source	MS	df	F	P
Total	9.53	60		
Between	17.30	7		
1. Programme	44.17	1	5.19	≤ 0.05
2. Technical feedback	30.22	1	3.55	
3. Inter-personal feedback	2.45	1	0.29	
4. 1 x 2	7.56	1	0.89	
5. 1 x 3	19.84	1	2.33	
6. 2 x 3	1.16	1	0.14	
7. 1 x 2 x 3	15.73	1	1.85	
Within cell	8.51	53		

(b) Pupil response behavioursCriterion behaviour:

Total original pupil responses

Source	MS	df	F	P
Total	24.90	60		
Between	35.94	7		
1. Programme	136.27	1	5.81	<.05
2. Technical feedback	3.21	1	0.14	
3. Inter-personal feedback	7.65	1	0.33	
4. 1 x 2	59.40	1	2.53	
5. 1 x 3	43.02	1	1.84	
6. 2 x 3	1.89	1	0.08	
7. 1 x 2 x 3	0.11	1	0.00	
Within cell	23.44	53		

Criterion behaviour

Total pupil responses supported

Source	MS	df	F	P
Total	33.18	60		
Between	73.63	7		
1. Programme	110.78	1	4.02	<.05
2. Technical feedback	24.93	1	0.90	
3. Inter-personal feedback	24.24	1	0.87	
4. 1 x 2	58.86	1	2.11	
5. 1 x 3	155.60	1	5.59	
6. 2 x 3	18.17	1	0.65	
7. 1 x 2 x 3	122.81	1	4.01	
Within cell	27.84	53		

Criterion behaviour:

Total pupil responses original and supported

Source	MS	df	F	P
Total	7.76	60		
Between	15.42	7		
1. Programme	30.22	1	4.48	<.05
2. Technical feedback	0.02	1	0.00	
3. Inter-personal feedback	0.48	1	0.07	
4. 1 x 2	19.84	1	2.94	
5. 1 x 3	35.82	1	5.31	<.05
6. 2 x 3	12.60	1	1.87	
7. 1 x 2 x 3	8.95	1	1.33	
Within cell	6.75	53		

Criterion behaviour

Total analysis and synthesis questions followed by original pupil response

Source	MS	df	F	P
Total	8.37			
Between	13.17	7		
1. Programme	30.99	1	4.02	<.05
2. Technical feedback	8.54	1	1.10	
3. Inter-personal feedback	24.76	1	3.20	
4. 1 x 2	7.56	1	0.98	
5. 1 x 3	7.37	1	0.95	
6. 2 x 3	11.63	1	1.50	
7. 1 x 2 x 3	1.32	1	0.17	
Within cell	7.73	53		

Criterion behaviour:

Total analysis and synthesis questions followed by pupil response supported

Source	MS	df	F	P
Total	16.48	60		
Between	32.98	7		
1. Programme	112.99	1	7.90	<.01
2. Technical feedback	0.85	1	0.06	
3. Inter-personal feedback	19.68	1	1.38	
4. 1 x 2	21.90	1	1.53	
5. 1 x 3	59.40	1	4.15	<.05
6. 2 x 3	2.29	1	0.16	
7. 1 x 2 x 3	13.73	1	0.96	
Within cell	14.30	53		

Criterion behaviour

Total analysis and synthesis questions followed by original and supported pupil responses

Source	MS	df	F	P
Total	5.09	60		
Between	5.99	7		
1. Programme	24.24	1	4.88	<.05
2. Technical feedback	0.01	1	0.00	
3. Inter-personal feedback	0.00	1	0.00	
4. 1 x 2	3.47	1	0.70	
5. 1 x 3	8.85	1	1.78	
6. 2 x 3	3.47	1	0.70	
7. 1 x 2 x 3	1.89	1	0.38	
Within cell	4.97	53		

- (c) Follow-up behaviours subsequent to the asking of an initial teacher question or a response to such a question

Criterion behaviour:

Total occasions no opportunity given to pupils to respond to a teacher question

Source	MS	df	F	P
Total	11.53	60		
Between	1.81	7		
1. Programme	2.45	1	0.19	
2. Technical feedback	0.48	1	0.04	
3. Inter-personal feedback	0.15	1	0.01	
4. 1 x 2	0.08	1	0.01	
5. 1 x 3	6.45	1	0.50	
6. 2 x 3	0.04	1	0.00	
7. 1 x 2 x 3	3.03	1	0.24	
Within cell	12.81	53		

Criterion behaviour

Total occasions no pupil response offered to a teacher question

Source	MS	df	F	P
Total	20.55	60		
Between	15.00	7		
1. Programme	3.27	1	0.15	
2. Technical feedback	0.64	1	0.03	
3. Inter-personal feedback	0.59	1	0.03	
4. 1 x 2	26.88	1	1.26	
5. 1 x 3	32.56	1	1.53	
6. 2 x 3	37.93	1	1.78	
7. 1 x 2 x 3	3.15	1	0.15	
Within cell	21.28	53		

Criterion behaviour:

Total teacher prompts

Source	MS	df	F	P
Total	4.46	60		
Between	6.09	7		
1. Programme	20.78	1	4.89	<.05
2. Technical feedback	2.24	1	0.53	
3. Inter-personal feedback	0.59	1	0.14	
4. 1 x 2	13.86	1	3.26	
5. 1 x 3	2.34	1	0.55	
6. 2 x 3	0.48	1	0.11	
7. 1 x 2 x 3	2.34	1	0.55	
Within cell	4.25	53		

Criterion behaviour

Total teacher probes

Source	MS	df	F	P
Total	7.56	60		
Between	14.51	7		
1. Programme	35.82	1	5.40	<.05
2. Technical feedback	12.84	1	1.94	
3. Inter-personal feedback	6.28	1	0.95	
4. 1 x 2	1.24	1	0.19	
5. 1 x 3	7.94	1	1.20	
6. 2 x 3	34.99	1	5.27	
7. 1 x 2 x 3	2.45	1	0.37	
Within cell	6.64	53		<.05

Criterion behaviour:

Analysis plus synthesis category probes

Source	MS	df	F	P
Total	4.43	60		
Between	9.98	7		
1. Programme	37.29	1	10.08	<.01
2. Technical feedback	2.51	1	0.68	
3. Inter-personal feedback	0.11	1	0.03	
4. 1 x 2	6.19	1	1.67	
5. 1 x 3	10.14	1	2.74	
6. 2 x 3	5.35	1	1.45	
7. 1 x 2 x 3	8.24	1	2.23	
Within cell	3.70	53		

APPENDIX M

SPRING SEMESTER 1973

POPULATION FROM SPRING SEMESTER 1972

ANOVA TABLES

(a) Teacher questioning behavioursCriterion behaviour:

Total knowledge and lower order synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	52.53	1		0.42	
2. Inter-personal feedback	123.29	1		0.98	
3. Technical feedback	47.74	1		0.38	
4. 2 x 3	288.76	1		2.30	
Within cell	5658.33	45	125.74		

Criterion behaviour:

Total comprehension, application, analysis and synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	11.49	1		0.09	
2. Inter-personal feedback	185.71	1		1.49	
3. Technical feedback	1.09	1		0.01	
4. 2 x 3	0.10	1		0.00	
Within cell	5599.95	45	124.44		

Criterion behaviour:

Total analysis and synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	5.67	1		0.18	
2. Inter-personal feedback	32.58	1		1.02	
3. Technical feedback	1.10	1		0.03	
4. 2 x 3	19.15	1		0.60	
Within cell	1436.37	45	31.92		

Criterion behaviour:

Total analysis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	0.63	1		0.03	
2. Inter-personal feedback	31.59	1		1.54	
3. Technical feedback	6.32	1		0.31	
4. 2 x 3	2.50	1		0.12	
Within cell	920.58	45	20.46		

Criterion behaviour:

Total synthesis teacher questions

Source	SS	df	MS	F	P
1. Control vs all other groups	2.51	1		0.32	
2. Inter-personal feedback	0.01	1		0.00	
3. Technical feedback	2.15	1		0.28	
4. 2 x 3	7.81	1		1.00	
Within cell	349.74	45	7.77		

(b) Pupil response behavioursCriterion behaviour:

Total original pupil responses

Source	SS	df	MS	F	P
1. Control vs all other groups	45.66	1		2.95	
2. Inter-personal feedback	4.97	1		0.32	
3. Technical feedback	1.07	1		0.07	
4. 2 x 3	3.86	1		0.25	
Within cell	695.45	45	15.45		

Criterion behaviour:

Total pupil responses supported

Source	SS	df	MS	F	P
1. Control vs all other groups	0.30	1		0.01	
2. Inter-personal feedback	5.96	1		0.23	
3. Technical feedback	14.75	1		0.58	
4. 2 x 3	11.67	1		0.46	
Within cell	1152.42	45	25.61		

Criterion behaviour:

Total pupil responses original and supported

Source	SS	df	MS	F	P
1. Control vs all other groups	0.53	1		0.10	
2. Inter-personal feedback	1.74	1		0.33	
3. Technical feedback	2.18	1		0.42	
4. 2 x 3	0.01	1		0.00	
Within cell	235.25	45	5.22		

Criterion behaviour:

Total analysis and synthesis questions followed by original pupil response

Source	SS	df	MS	F	P
1. Control vs all other groups	16.29	1		4.60	<05
2. Inter-personal feedback	0.12	1		0.03	
3. Technical feedback	1.47	1		0.42	
4. 2 x 3	1.40	1		0.40	
Within cell	159.34	45	3.54		

Criterion behaviour:

Total analysis and synthesis questions followed by pupil response supported

Source	SS	df	MS	F	P
1. Control vs all other groups	1.45	1		0.13	
2. Inter-personal feedback	2.67	1		0.24	
3. Technical feedback	11.17	1		1.00	
4. 2 x 3	0.37	1		0.03	
Within cell	501.79	45	11.15		

Criterion behaviour:

Total analysis and synthesis questions followed by original and supported pupil responses

Source	SS	df	MS	F	P
1. Control vs all other groups	0.26	1		0.07	
2. Inter-personal feedback	0.28	1		0.08	
3. Technical feedback	1.31	1		0.37	
4. 2 x 3	0.56	1		0.16	
Within cell	161.61	45	3.59		

- (c) Follow-up behaviours subsequent to the asking of an initial question and responses to such a question

Criterion behaviour:

Total occasions no opportunity given to pupils to respond to a teacher question

Source	SS	df	MS	F	P
1. Control vs all other groups	1.49	1		0.11	
2. Inter-personal feedback	1.82	1		0.13	
3. Technical feedback	37.30	1		2.73	
4. 2 x 3	12.11	1		0.89	
Within cell	614.01	45	13.64		

Criterion behaviour:

Source	SS	df	MS	F	P
1. Control vs all other groups	61.07	1		3.50	
2. Inter-personal feedback	57.10	1		3.28	
3. Technical feedback	35.51	1		2.04	
4. 2 x 3	0.13	1		0.01	
Within cell	784.08	45	17.42		

Criterion behaviour:

Total teacher prompts

Source	SS	df	MS	F	P
1. Control vs all other groups	10.51	1		2.09	<01
2. Inter-personal feedback	40.42	1		8.04	
3. Technical feedback	7.04	1		1.40	
4. 2 x 3	0.07	1		0.01	
Within cell	226.17	45	5.03		

Criterion behaviour:

Total teacher probes

Source	SS	df	MS	F	P
1. Control vs all other groups	6.95	1		0.61	
2. Inter-personal feedback	0.88	1		0.08	
3. Technical feedback	4.77	1		0.42	
4. 2 x 3	4.89	1		0.43	
Within cell	510.78	45			

Criterion behaviour:

Analysis plus synthesis category probes

Source	SS	df	MS	F	P
1. Control vs all other groups	1.18	1		0.36	
2. Inter-personal feedback	0.93	1		0.29	
3. Technical feedback	2.05	1		0.63	
4. 2 x 3	1.86	1		0.58	
Within cell	145.69	45	3.24		

APPENDIX N

SPRING SEMESTER 1973

POPULATION FROM AUTUMN SEMESTER 1972

ANOVA TABLES

(a) Teacher questioning behavioursCriterion behaviour:

Total knowledge and lower order synthesis teacher questions

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	46.69	1	1.49	
2. Technical feedback	7.14	1	0.23	
3. Inter-personal feedback	0.19	1	0.01	
4. 1 x 2	10.08	1	0.32	
5. 1 x 3	11.82	1	0.38	
6. 2 x 3	85.82	1	2.74	
7. 1 x 2 x 3	0.43	1	0.01	
Within cell	31.36	22		

Criterion behaviour

Total comprehension, application, analysis and synthesis teacher questions

Source	MS	df	F	P
Total	71.62	29		
Between	46.43	7		
1. Programme	1.53	1	0.02	
2. Technical feedback	70.54	1	0.89	
3. Inter-personal feedback	1.59	1	0.02	
4. 1 x 2	0.15	1	0.00	
5. 1 x 3	1.93	1	0.02	
6. 2 x 3	29.14	1	0.37	
7. 1 x 2 x 3	220.15	1	2.76	
Within cell	79.63	22		

(a) Teacher questioning behavioursCriterion behaviour:

Total analysis and synthesis teacher questions

Source	MS	df	F	P
Total	42.39	29		
Between	40.66	7		
1. Programme	164.70	1	3.83	
2. Technical feedback	7.61	1	0.18	
3. Inter-personal feedback	46.69	1	1.09	
4. 1 x 2	30.46	1	0.71	
5. 1 x 3	2.09	1	0.05	
6. 2 x 3	3.55	1	0.08	
7. 1 x 2 x 3	29.50	1	0.69	
Within cell	42.95	22		

Criterion behaviour

Total analysis teacher questions

Source	MS	df	F	P
Total	23.12	29		
Between	23.57	7		
1. Programme	32.17	1	1.40	
2. Technical feedback	6.79	1	0.30	
3. Inter-personal feedback	74.83	1	3.26	
4. 1 x 2	41.74	1	1.82	
5. 1 x 3	0.17	1	0.01	
6. 2 x 3	1.79	1	0.08	
7. 1 x 2 x 3	7.49	1	0.33	
Within cell	22.98	22		

Criterion behaviour:

Total synthesis teacher questions

Source	MS	df	F	P
Total	10.20	29		
Between	10.60	7		
1. Programme	51.29	1	5.09	<.05
2. Technical feedback	0.02	1	0.00	
3. Inter-personal feedback	3.30	1	0.33	
4. 1 x 2	0.89	1	0.09	
5. 1 x 3	1.06	1	0.11	
6. 2 x 3	10.36	1	1.03	
7. 1 x 2 x 3	7.26	1	0.72	
Within cell	10.07	22		

(b) Pupil response behavioursCriterion behaviour:

Total original pupil responses

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	52.71	1	1.82	
2. Technical feedback	20.85	1	0.72	
3. Inter-personal feedback	0.48	1	0.02	
4. 1 x 2	0.09	1	0.00	
5. 1 x 3	5.41	1	0.19	
6. 2 x 3	0.09	1	0.00	
7. 1 x 2 x 3	21.45	1	0.75	
Within cell	28.89	22		

Criterion behaviour

Total pupil responses supported

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	36.40	1	1.48	
2. Technical feedback	74.64	1	3.03	
3. Inter-personal feedback	2.38	1	0.10	
4. 1 x 2	0.05	1	0.00	
5. 1 x 3	0.31	1	0.01	
6. 2 x 3	2.66	1	0.11	
7. 1 x 2 x 3	37.47	1	1.52	
Within cell	24.58	22		

Criterion behaviour:

Total pupil responses original and supported

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	21.86	1	1.77	
2. Technical feedback	5.96	1	0.48	
3. Inter-personal feedback	0.06	1	0.01	
4. 1 x 2	3.34	1	0.27	
5. 1 x 3	1.53	1	0.12	
6. 2 x 3	4.65	1	0.38	
7. 1 x 2 x 3	26.15	1	2.12	
Within cell	12.33	22		

Criterion behaviour

Total analysis and synthesis questions followed by original pupil response

Source	MS	df	F	P
Total	5.14	29		
Between	2.83	7		
1. Programme	6.68	1	1.14	
2. Technical feedback	0.66	1	0.11	
3. Inter-personal feedback	0.89	1	0.15	
4. 1 x 2	2.15	1	0.37	
5. 1 x 3	8.48	1	1.44	
6. 2 x 3	0.23	1	0.04	
7. 1 x 2 x 3	0.69	1	0.12	
Within cell	5.88	22		

Criterion behaviour:

Total analysis and synthesis questions followed by pupil response supported

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	87.65	1	6.75	<05
2. Technical feedback	8.42	1	0.65	
3. Inter-personal feedback	35.61	1	2.74	
4. 1 x 2	8.42	1	0.65	
5. 1 x 3	0.51	1	0.04	
6. 2 x 3	0.24	1	0.02	
7. 1 x 2 x 3	7.80	1	0.61	
Within cell	12.98	22		

Criterion behaviour

Total analysis and synthesis questions followed by original and supported pupil responses

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	13.46	1	2.40	
2. Technical feedback	1.32	1	0.24	
3. Inter-personal feedback	7.43	1	1.33	
4. 1 x 2	0.01	1	0.00	
5. 1 x 3	1.32	1	0.24	
6. 2 x 3	1.59	1	0.28	
7. 1 x 2 x 3	8.81	1	1.57	
Within cell	5.60	22		

- (c) Follow-up behaviours subsequent to the asking of an initial teacher question or a response to such a question

Criterion behaviour:

Total occasions no opportunity given to pupils to respond to a teacher question

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	38.96	1	7.12	<.05
2. Technical feedback	23.21	1	4.24	
3. Inter-personal feedback	0.05	1	0.01	
4. 1 x 2	0.30	1	0.05	
5. 1 x 3	4.33	1	0.79	
6. 2 x 3	3.88	1	0.71	
7. 1 x 2 x 3	5.29	1	0.97	
Within cell	5.47	22		

Criterion behaviour

Total occasions no pupil response offered to a teacher question

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	1.30	1	0.18	<.05
2. Technical feedback	38.14	1	5.36	
3. Inter-personal feedback	27.63	1	3.89	
4. 1 x 2	10.79	1	1.52	
5. 1 x 3	2.49	1	0.35	
6. 2 x 3	0.00	1	0.00	
7. 1 x 2 x 3	5.80	1	0.82	
Within cell	7.11	22		

Criterion behaviour:

Total teacher prompts

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	0.00	1	0.00	
2. Technical feedback	7.20	1	5.31	<.05
3. Inter-personal feedback	0.26	1	0.20	
4. 1 x 2	6.51	1	4.80	<.05
5. 1 x 3	0.15	1	0.11	
6. 2 x 3	0.07	1	0.06	
7. 1 x 2 x 3	0.64	1	0.47	
Within cell	1.36	22		

Criterion behaviour

Total teacher probes

Source	MS	df	F	P
Total		29		
Between		7		
1. Programme	2.06	1	0.24	
2. Technical feedback	16.33	1	1.90	
3. Inter-personal feedback	2.00	1	0.23	
4. 1 x 2	10.15	1	1.18	
5. 1 x 3	0.31	1	0.04	
6. 2 x 3	2.66	1	0.31	
7. 1 x 2 x 3	0.10	1	0.01	
Within cell	8.58	22		

Criterion behaviour:

Analysis plus synthesis category probes

Source	MS	df	F	P
Total	3.52	29		
Between	1.34	7		
1. Programme	6.85	1	1.63	
2. Technical feedback	0.05	1	0.01	
3. Inter-personal feedback	0.48	1	0.11	
4. 1 x 2	0.01	1	0.22	
5. 1 x 3	0.57	1	0.14	
6. 2 x 3	0.29	1	0.07	
7. 1 x 2 x 3	0.22	1	0.05	
Within cell	4.21	22		

APPENDIX O

QUESTIONNAIRE TO STUDENTS

AUTUMN SEMESTER 1972

TABULATION OF RESPONSES

Questionnaire Analysis

Section One:

Ability No.:

1. To ask questions designed to encourage the pupils to use previously learned ideas in contexts different from those encountered

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	8	8	7	7	16	14	15	15	30
		No	0	0	0	0	0	0	0	0	0
	ALTERNATIVE	Yes	8	7	8	7	15	15	16	14	30
		No	0	0	0	0	0	0	0	0	0
	TOTALS	Yes	16	15	15	14	31	29	31	29	60
		No	0	0	0	0	0	0	0	0	0

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	5	6	5	5	11	10	10	11	21
		No	3	2	2	2	5	4	5	4	9
	ALTERNATIVE	Yes	6	1	7	5	7	12	13	6	19
		No	2	6	1	2	8	3	3	8	11
	TOTALS	Yes	11	7	12	10	18	22	23	17	40
		No	5	8	3	4	13	7	8	12	20

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	4	5	6	5	9	11	10	10	20
		No	4	3	1	2	7	3	5	5	10
	ALTERNATIVE	Yes	4	4	6	5	8	11	10	9	19
		No	4	3	2	2	7	4	6	5	11
	TOTALS	Yes	8	9	12	10	17	22	20	19	39
		No	8	6	3	4	14	7	11	10	21

Questionnaire Analysis

Section One:

Ability No.:

2. To structure questions which do not imply a particular answer or impose an unintentional bias upon the answer

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR NO TUTOR	VIDEO TUTOR NO TUTOR	TUTOR AUDIO AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR					
STIRLING	Yes		8	7	6	6	15	12	14	3	27
	No		0	1	1	1	1	2	1	2	3
ALTERNATIVE	Yes		8	7	8	6	15	14	16	13	29
	No		0	0	0	1	0	1	0	1	1
TOTALS	Yes		16	14	14	12	30	26	30	26	56
	No		0	1	1	2	1	3	1	3	4

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR NO TUTOR	VIDEO TUTOR NO TUTOR	TUTOR AUDIO AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR					
STIRLING	Yes		4	7	6	6	11	12	10	13	23
	No		4	1	1	1	5	2	5	8	7
ALTERNATIVE	Yes		7	4	5	4	11	9	12	8	20
	No		1	3	3	3	4	6	4	6	10
TOTALS	Yes		11	11	11	10	22	21	22	21	43
	No		5	4	4	4	9	8	9	8	17

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR NO TUTOR	VIDEO TUTOR NO TUTOR	TUTOR AUDIO AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR					
STIRLING	Yes		7	5	7	4	12	11	14	9	23
	No		1	3	0	3	4	3	1	6	7
ALTERNATIVE	Yes		6	4	6	4	10	10	12	8	20
	No		2	3	2	3	5	5	4	6	10
TOTALS	Yes		13	9	13	8	22	21	26	17	43
	No		3	6	2	6	9	8	5	12	17

Questionnaire Analysis

Section One:

Ability No.:

3. To ask questions, which determine the pupils' initial interests, attitudes, knowledge, or skills relevant to the lesson to follow

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	8	7	7	7	15	14	15	14	29
		No	0	1	0	0	1	0	0	1	1
	ALTERNATIVE	Yes	7	7	8	6	14	14	15	13	28
		No	1	0	0	1	1	1	1	1	2
	TOTALS	Yes	15	14	15	13	29	28	30	27	57
		No	1	1	0	1	2	1	1	2	3

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	6	4	5	7	10	12	11	11	22
		No	2	4	2	0	6	2	4	4	8
	ALTERNATIVE	Yes	2	6	5	5	8	10	7	11	18
		No	6	1	3	2	7	5	9	3	12
	TOTALS	Yes	8	10	10	12	18	22	18	22	40
		No	8	5	5	2	13	7	13	7	20

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	4	6	5	6	10	11	9	12	21
		No	4	2	2	1	6	3	6	3	9
	ALTERNATIVE	Yes	2	3	4	5	5	9	6	8	14
		No	6	4	4	2	10	6	10	6	16
	TOTALS	Yes	6	9	9	11	15	20	15	20	35
		No	10	6	6	3	16	9	16	9	25

Questionnaire Analysis

Section One:

Ability No.:

4. To ask questions designed to set the pupils a task which is planned to help them achieve selected goals

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	5	6	7	7	11	14	12	13	25
		No	3	2	0	0	5	0	3	2	5
	ALTERNATIVE	Yes	7	6	8	4	13	12	15	10	25
		No	1	1	0	3	2	3	1	4	5
	TOTALS	Yes	12	12	15	11	24	26	27	23	50
		No	4	3	0	3	7	3	4	6	10

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	3	5	3	5	8	8	6	10	16
		No	5	3	4	2	8	6	9	5	14
	ALTERNATIVE	Yes	3	3	7	3	6	10	10	6	16
		No	5	4	1	4	9	5	6	8	14
	TOTALS	Yes	6	8	10	8	14	18	16	16	32
		No	10	7	5	6	17	11	15	13	28

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	5	4	2	4	9	6	7	8	15
		No	3	4	5	3	7	8	8	7	15
	ALTERNATIVE	Yes	4	1	4	3	5	7	8	4	12
		No	4	6	4	4	10	8	8	10	18
	TOTALS	Yes	9	5	6	7	14	13	15	12	27
		No	7	10	9	7	17	16	16	17	33

Questionnaire Analysis

Section One:

Ability No.:

5. To ask questions designed to encourage the pupils to produce new ideas based upon a sifting of ideas from many sources

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	8	7	7	7	15	14	15	14	29
		No	0	1	0	0	1	0	0	1	1
ALTERNATIVE		Yes	8	7	8	7	15	15	16	14	30
		No	0	0	0	0	0	0	0	0	0
TOTALS		Yes	16	14	15	14	30	29	31	28	59
		No	0	1	0	0	1	0	0	1	1

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	3	3	5	4	6	9	8	7	15
		No	5	5	2	3	10	5	7	8	15
ALTERNATIVE		Yes	5	5	7	6	10	13	12	11	23
		No	3	2	1	1	5	2	4	3	7
TOTALS		Yes	8	8	12	10	16	22	20	18	38
		No	8	7	3	4	15	7	11	11	22

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	5	4	7	5	9	12	12	9	21
		No	3	4	0	2	7	2	3	6	9
ALTERNATIVE		Yes	6	4	5	5	10	10	11	9	20
		No	2	3	3	2	5	5	5	5	10
TOTALS		Yes	11	8	12	10	19	22	23	18	41
		No	5	7	3	4	12	7	8	11	19

Questionnaire Analysis

Section One:

Ability No.:

6. To ask questions only when one is facing the pupils

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	2	5	4	2	7	6	6	7	13
		No	6	3	3	5	9	8	9	8	17
ALTERNATIVE		Yes	2	2	2	2	4	4	4	4	8
		No	6	5	6	5	11	11	12	10	22
TOTALS		Yes	4	7	6	4	11	10	10	11	21
		No	12	8	9	10	20	19	21	18	39

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	2	3	2	0	5	2	4	3	7
		No	6	5	5	7	11	12	11	12	23
ALTERNATIVE		Yes	2	0	1	2	2	3	3	2	5
		No	6	7	7	5	13	12	13	12	25
TOTALS		Yes	4	3	3	2	7	5	7	5	12
		No	12	12	12	12	24	24	24	24	48

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	1	3	2	1	4	3	3	4	7
		No	7	5	5	6	12	11	12	11	23
ALTERNATIVE		Yes	2	2	1	2	4	3	3	4	7
		No	6	5	7	5	11	12	13	10	23
TOTALS		Yes	3	5	3	3	8	6	6	8	14
		No	13	10	12	11	23	23	25	21	46

Questionnaire Analysis

Section One:

Ability No.:

7. To ask questions which seek to establish whether pupils have understood concepts or relationships in the material under discussion

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		8	8	7	7	16	14	15	15	30
	No		0	0	0	0	0	0	0	0	0
ALTERNATIVE	Yes		8	7	8	7	15	15	16	14	30
	No		0	0	0	0	0	0	0	0	0
TOTALS	Yes		16	15	15	14	31	29	31	29	60
	No		0	0	0	0	0	0	0	0	0

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		8	8	6	6	16	12	14	14	28
	No		0	0	1	1	0	2	1	1	2
ALTERNATIVE	Yes		8	6	6	7	14	13	14	13	27
	No		0	1	2	0	1	2	2	1	3
TOTALS	Yes		16	14	12	13	30	25	28	27	55
	No		0	1	3	1	1	4	3	2	5

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		8	6	6	6	14	12	14	12	26
	No		0	2	1	1	2	2	1	3	4
ALTERNATIVE	Yes		8	6	8	6	14	14	16	12	28
	No		0	1	0	1	1	1	0	2	2
TOTALS	Yes		16	12	14	12	28	26	30	24	54
	No		0	3	1	2	3	3	1	5	6

Questionnaire Analysis

Section One:

Ability No.:

8. To ask questions as a follow-up to pupil responses which are vague or only partial completions of the set tasks

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		7	8	7	7	15	14	14	15	29
	No		1	0	0	0	1	0	1	0	1
ALTERNATIVE	Yes		8	7	8	7	15	15	16	14	30
	No		0	0	0	0	0	0	0	0	0
TOTALS	Yes		15	15	15	14	30	29	30	29	59
	No		1	0	0	0	1	0	1	0	1

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		5	8	4	7	13	11	9	15	24
	No		3	0	3	0	3	3	6	0	6
ALTERNATIVE	Yes		8	6	8	7	14	15	16	13	29
	No		0	1	0	0	1	0	0	1	1
TOTALS	Yes		13	14	12	14	27	26	25	28	53
	No		3	1	3	0	4	3	6	1	7

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING	Yes		7	8	6	5	15	11	13	13	26
	No		1	0	1	2	1	3	2	2	4
ALTERNATIVE	Yes		8	6	7	7	14	14	15	13	28
	No		0	1	1	0	1	1	1	1	2
TOTALS	Yes		15	14	13	12	29	25	28	26	54
	No		1	1	2	2	2	4	3	3	6

Questionnaire Analysis

Section One:

Ability No.:

9. To ask questions designed to help pupils achieve goals other than memorization of knowledge

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	8	8	7	7	16	14	15	15	30
		No	0	0	0	0	0	0	0	0	0
	ALTERNATIVE	Yes	8	7	8	6	15	14	16	13	29
		No	0	0	0	1	0	1	0	1	1
	TOTALS	Yes	16	15	15	13	31	28	31	28	59
		No	0	0	0	1	0	1	0	1	1

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	6	8	5	6	14	11	11	14	25
		No	2	0	2	1	2	3	4	1	5
	ALTERNATIVE	Yes	7	6	6	6	13	12	13	12	25
		No	1	1	2	1	2	3	3	2	5
	TOTALS	Yes	13	14	11	12	27	23	24	26	50
		No	3	1	4	2	4	6	7	3	10

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	5	7	4	7	12	11	9	14	23
		No	3	1	3	0	4	3	6	1	7
	ALTERNATIVE	Yes	7	4	8	6	11	14	15	10	25
		No	1	3	0	1	4	1	1	4	5
	TOTALS	Yes	12	11	12	13	23	25	24	24	48
		No	4	4	3	1	8	4	7	5	12

Questionnaire Analysis

Section One:

Ability No.:

10. To ask questions designed to encourage the pupil to apply a known idea to a new situation

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	8	8	7	7	16	14	15	15	30
		No	0	0	0	0	0	0	0	0	0
	ALTERNATIVE	Yes	7	7	8	7	14	15	15	14	29
		No	1	0	0	0	1	0	1	0	1
	TOTALS	Yes	15	15	15	14	30	29	30	29	59
		No	1	1	0	0	1	0	1	0	1

PROGRAMM HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	3	8	5	7	11	12	8	15	23
		No	5	0	2	0	5	2	7	0	7
	ALTERNATIVE	Yes	6	2	7	6	8	13	13	8	21
		No	2	5	1	1	7	2	3	6	9
	TOTALS	Yes	9	10	12	13	19	25	21	23	44
		No	7	5	3	1	12	4	10	6	16

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	5	5	5	5	10	10	10	10	20
		No	3	3	2	2	6	4	5	5	10
	ALTERNATIVE	Yes	7	2	6	3	9	9	13	5	18
		No	1	5	2	4	6	6	3	9	12
	TOTALS	Yes	12	7	11	8	19	19	23	15	38
		No	4	8	4	6	12	10	8	14	22

Questionnaire Analysis

Section One:

Ability No.:

11. To ask questions to encourage the pupil to organize or use ideas encountered in familiar contexts

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	5	8	7	7	13	14	12	15	27
		No	3	0	0	0	3	0	3	0	3
ALTERNATIVE		Yes	7	7	8	6	14	14	15	13	28
		No	1	0	0	1	1	1	1	1	2
TOTALS		Yes	12	15	15	13	27	28	27	28	55
		No	4	0	0	1	4	1	4	1	5

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	3	5	5	6	8	11	8	11	19
		No	5	3	2	1	8	3	7	4	11
ALTERNATIVE		Yes	5	1	8	3	6	11	13	4	17
		No	3	6	0	4	9	4	3	10	13
TOTALS		Yes	8	6	13	9	14	22	21	15	36
		No	8	9	2	5	17	7	10	14	24

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	4	4	6	5	8	11	10	9	19
		No	4	4	1	2	8	3	5	6	11
ALTERNATIVE		Yes	5	5	5	3	10	8	10	8	18
		No	3	2	3	4	5	7	6	6	12
TOTALS		Yes	9	9	11	8	18	19	20	17	37
		No	7	6	4	6	13	10	11	12	23

Questionnaire Analysis

Section One:

Ability No.:

12. To ask questions designed to encourage the pupil to analyze a problem or situation

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	8	8	7	7	16	14	15	15	30
		No	0	0	0	0	0	0	0	0	0
	ALTERNATIVE	Yes	8	7	8	7	15	15	16	14	30
		No	0	0	0	0	0	0	0	0	0
	TOTALS	Yes	16	15	15	14	31	29	31	29	60
		No	0	0	0	0	0	0	0	0	0

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	7	8	6	6	15	12	13	14	27
		No	1	0	1	1	1	2	2	1	3
	ALTERNATIVE	Yes	7	7	7	7	14	14	14	14	28
		No	1	0	1	0	1	1	2	0	2
	TOTALS	Yes	14	15	13	13	29	26	27	28	55
		No	2	0	2	1	2	3	4	1	5

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	7	6	5	6	13	11	13	12	25
		No	1	2	2	1	3	3	3	3	5
	ALTERNATIVE	Yes	6	7	8	6	13	14	14	13	27
		No	2	0	0	1	2	1	2	1	3
	TOTALS	Yes	13	13	13	12	26	25	26	25	51
		No	3	2	2	2	5	4	5	4	9

Questionnaire Analysis

Section One:

Ability No.:

13. To give notice to a pupil of
an impending question

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	3	5	1	5	8	6	4	10	14
		No	5	3	6	2	8	8	11	5	16
	ALTERNATIVE	Yes	2	3	1	3	5	4	3	6	9
		No	6	4	7	4	10	11	13	8	21
	TOTALS	Yes	5	8	2	8	13	10	7	16	23
		No	11	7	13	6	18	19	24	13	37

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	0	3	0	3	3	3	0	6	6
		No	8	5	7	4	13	11	15	9	24
	ALTERNATIVE	Yes	2	1	2	2	3	3	3	3	6
		No	6	6	6	5	12	12	13	11	24
	TOTALS	Yes	2	4	2	5	6	6	3	9	12
		No	14	11	13	9	25	23	28	20	48

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	0	2	0	1	2	1	0	3	3
		No	8	6	7	6	14	13	15	12	27
	ALTERNATIVE	Yes	0	1	2	0	1	2	2	1	3
		No	8	6	6	7	14	13	14	13	27
	TOTALS	Yes	0	3	2	1	3	3	2	4	6
		No	16	12	13	13	28	26	29	25	54

Questionnaire Analysis

Section One:

Ability No.:

14. To offer some clue, or ask a question in a restructured form when the pupil does not respond to an initial question

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING		Yes	8	7	6	7	15	13	14	14	28
		No	0	1	1	0	1	1	1	1	2
ALTERNATIVE		Yes	8	7	8	6	15	14	16	13	29
		No	0	0	0	1	0	1	0	1	1
TOTALS		Yes	16	14	14	13	30	27	30	27	57
		No	0	1	1	1	1	2	1	2	3

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING		Yes	6	7	4	7	13	11	10	14	24
		No	2	1	3	0	3	3	5	1	6
ALTERNATIVE		Yes	5	3	6	3	8	9	11	6	17
		No	3	4	2	4	7	6	5	8	3
TOTALS		Yes	11	10	10	10	21	20	21	20	41
		No	5	5	5	4	10	9	10	9	19

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
STIRLING		Yes	7	7	5	6	14	11	12	13	25
		No	1	1	2	1	2	3	3	2	5
ALTERNATIVE		Yes	7	6	7	5	13	12	14	11	25
		No	1	1	1	2	2	3	2	3	5
TOTALS		Yes	14	13	12	11	27	23	26	24	50
		No	2	2	3	3	4	6	5	5	10

Questionnaire Analysis

Section One:

Ability No.:

15. To ask questions which seek to develop the pupils' ability in general skills of thinking

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	8	8	6	6	16	12	14	14	28
		No	0	0	1	1	0	2	1	1	2
	ALTERNATIVE	Yes	7	7	7	7	14	14	14	14	28
		No	1	0	1	0	1	1	2	0	2
	TOTALS	Yes	15	15	13	13	30	26	28	28	56
		No	1	0	2	1	1	3	3	1	4

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	7	6	2	6	13	8	9	12	21
		No	1	2	5	1	3	6	6	3	9
	ALTERNATIVE	Yes	5	7	5	6	12	11	10	13	23
		No	3	0	3	1	3	4	6	1	7
	TOTALS	Yes	12	13	7	12	25	19	19	25	44
		No	4	2	8	2	6	10	12	4	16

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
	STIRLING	Yes	4	6	4	5	10	9	8	11	19
		No	4	2	3	2	6	5	7	4	11
	ALTERNATIVE	Yes	3	7	6	5	10	11	9	12	21
		No	5	0	2	2	5	4	7	2	9
	TOTALS	Yes	7	13	10	10	20	20	17	23	40
		No	9	2	5	4	11	9	14	6	20

Questionnaire Analysis

Section One:

Ability No.:

16. To pay attention to individual pupil responses

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	7	8	7	7	15	14	14	15	29
		No	1	0	0	0	1	0	1	0	1
ALTERNATIVE		Yes	7	7	8	7	14	15	15	14	29
		No	1	0	0	0	1	0	1	0	1
TOTALS		Yes	14	15	15	14	29	29	29	29	58
		No	2	0	0	0	2	0	2	0	2

PROGRAMM HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	6	5	5	7	11	12	11	12	23
		No	2	3	2	0	5	2	4	3	7
ALTERNATIVE		Yes	5	4	6	6	9	12	11	10	21
		No	3	3	2	1	6	3	5	4	9
TOTALS		Yes	11	9	11	13	20	24	22	22	44
		No	5	6	4	1	11	5	9	7	16

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	7	8	7	6	15	13	14	14	28
		No	1	0	0	1	1	1	1	1	2
ALTERNATIVE		Yes	5	6	7	6	11	13	12	12	24
		No	3	1	1	1	4	2	4	2	6
TOTALS		Yes	12	14	14	12	26	26	26	26	52
		No	4	1	1	2	5	3	5	3	8

Questionnaire Analysis

Section One:

Ability No.:

17. To engage all members of the class in the lesson

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	7	7	7	7	14	14	14	14	28
		No	1	1	0	0	2	0	1	1	2
ALTERNATIVE		Yes	7	7	8	7	14	15	15	14	29
		No	1	0	0	0	1	0	1	0	1
TOTALS		Yes	14	14	15	14	28	29	29	28	57
		No	2	1	0	0	3	0	2	1	3

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	6	6	5	7	12	12	11	13	24
		No	2	2	2	0	4	2	4	2	6
ALTERNATIVE		Yes	6	4	4	6	10	10	10	10	20
		No	2	3	4	1	5	5	6	4	10
TOTALS		Yes	12	10	9	13	22	22	21	23	44
		No	4	5	6	1	9	7	10	6	16

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	5	7	6	6	12	12	11	13	24
		No	3	1	1	1	4	2	4	2	6
ALTERNATIVE		Yes	6	7	6	4	13	1	12	11	23
		No	2	0	2	3	2	5	4	3	7
TOTALS		Yes	11	14	12	10	25	22	23	24	47
		No	5	1	3	4	6	7	8	5	13

Questionnaire Analysis

Section One:

Ability No.:

18. To ask questions designed to encourage pupils to break down material into constituent parts, and to detect the relationship of the parts and the way they are organized

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes	7	7	7	6	14	13	14	13	27	
	No	1	1	0	1	2	1	1	2	3	
ALTERNATIVE	Yes	7	6	8	7	13	15	15	13	28	
	No	1	1	0	0	2	0	1	1	2	
TOTALS	Yes	14	13	15	13	27	28	29	26	55	
	No	2	2	0	1	4	1	2	3	5	

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes	4	6	2	3	10	5	6	9	15	
	No	4	2	5	4	6	9	9	6	15	
ALTERNATIVE	Yes	6	5	7	5	11	12	13	10	23	
	No	2	2	1	2	4	3	3	4	7	
TOTALS	Yes	10	11	9	8	21	17	19	19	38	
	No	6	4	6	6	10	12	12	10	22	

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes	2	5	3	4	7	7	5	9	14	
	No	6	3	4	3	9	7	10	6	16	
ALTERNATIVE	Yes	6	3	4	3	9	7	10	6	16	
	No	2	4	4	4	6	8	6	8	14	
TOTALS	Yes	8	8	7	7	16	14	15	15	30	
	No	8	7	8	7	15	15	16	14	30	

Questionnaire Analysis

Section One:

Ability No.:

19. To ask questions which encourage the pupil to exemplify a given idea, to justify a conclusion, or to outline criteria for an expressed opinion

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	8	8	7	7	16	14	15	15	30
		No	0	0	0	0	0	0	0	0	0
	ALTERNATIVE	Yes	8	7	8	6	15	14	16	13	29
		No	0	0	0	1	0	1	0	1	1
	TOTALS	Yes	16	15	15	13	31	28	31	28	59
		No	0	0	0	1	0	1	0	1	1

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	7	6	4	6	13	10	11	12	23
		No	1	2	3	1	3	4	4	3	7
	ALTERNATIVE	Yes	8	5	7	4	13	11	15	9	24
		No	0	2	1	3	2	4	1	5	6
	TOTALS	Yes	15	11	11	10	26	21	26	21	47
		No	1	4	4	4	5	8	5	8	13

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
	STIRLING	Yes	8	7	5	4	15	9	13	11	24
		No	0	1	2	3	1	5	2	4	6
	ALTERNATIVE	Yes	8	6	7	4	14	11	15	10	25
		No	0	1	1	3	1	4	1	4	5
	TOTALS	Yes	16	13	12	8	29	20	28	21	49
		No	0	2	3	6	2	9	3	8	11

Section One:

Ability No.:

20. To ask questions which encourage pupils to contribute information concerning their acquired knowledge, experiences, interests, and attitudes

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	8	8	7	6	16	13	15	14	29
		No	0	0	0	1	0	1	0	1	1
ALTERNATIVE		Yes	8	7	8	7	15	15	16	14	30
		No	0	0	0	0	0	0	0	0	0
TOTALS		Yes	16	15	15	13	31	28	31	28	59
		No	0	0	0	1	0	1	0	1	1

PROGRAMME HELPFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	5	7	4	6	12	10	9	13	22
		No	3	1	3	1	4	4	6	2	8
ALTERNATIVE		Yes	5	4	6	6	9	12	11	10	21
		No	3	3	2	1	6	3	5	4	9
TOTALS		Yes	10	11	10	12	21	22	20	23	43
		No	6	4	5	2	10	7	11	6	17

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING		Yes	5	6	6	7	11	13	11	13	24
		No	3	2	1	0	5	1	4	2	6
ALTERNATIVE		Yes	5	6	5	6	11	11	10	12	22
		No	3	1	3	1	4	4	6	2	8
TOTALS		Yes	10	12	11	13	22	24	21	25	46
		No	6	3	4	1	9	5	10	4	14

Questionnaire Analysis

Section One:

Ability No.:

21. To structure questions which already indicate to the pupils the sort of answer required

OBJECTIVE VALUABLE

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes		2	4	1	1	6	2	3	5	8
	No		6	4	6	6	10	12	12	10	22
ALTERNATIVE	Yes		3	3	5	2	6	7	8	5	13
	No		5	4	3	5	9	8	8	9	17
TOTALS	Yes		5	7	6	3	12	9	11	10	21
	No		11	8	9	11	19	20	20	19	39

PROGRAMME HELPIFUL

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes		3	4	1	1	7	2	4	5	9
	No		5	4	6	6	9	12	11	10	21
ALTERNATIVE	Yes		3	3	3	1	6	4	6	4	10
	No		5	4	5	6	9	11	10	10	20
TOTALS	Yes		6	7	4	2	13	6	10	9	19
	No		10	8	11	12	18	23	21	20	41

IMPROVEMENT CLAIMED

	COURSE	ANSWER	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
			AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
			TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	NO TUTOR	
STIRLING	Yes		1	6	1	1	7	2	2	7	9
	No		7	2	6	6	9	12	13	8	21
ALTERNATIVE	Yes		3	3	4	0	6	4	7	3	10
	No		5	4	4	7	9	11	9	11	20
TOTALS	Yes		4	9	5	1	13	6	9	10	19
	No		12	6	10	13	18	23	22	19	41

7. (You may underline more than one alternative)
If your answer to question 6 was yes, which of the following contributed significantly to this difficulty?

- (i) you did not have a clear idea of the ability to be practised,
(ii) the ability could not be separated from other aspects of your teaching,
(iii) you were distracted by the feeling of being observed,
(iv) the short lesson prevented the development of your attempt to practise the ability,
(v) response of the pupils was disheartening,
(vi) the subject matter chosen was inappropriate for the ability practised,
(vii) response of the pupils led the discussion into other fields,
(viii) you had misleading preconceptions about the abilities or previous knowledge of the pupils,
(ix) other reasons (specify)

QUESTION	COURSE	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
		AUDIO		VIDEO		AUDIO TUTOR	VIDEO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
		TUTOR	NO TUTOR	TUTOR	NO TUTOR	NO TUTOR	NO TUTOR			
		0	1	2	2	1	4	2	3	5
I		3	4	2	4	7	6	5	8	13
II		1	1	0	0	2	0	1	1	2
III		3	4	0	3	7	3	3	7	10
IV	STIRLING	1	1	1	0	2	1	2	1	3
V		1	1	0	0	2	0	1	1	2
VI		3	2	2	3	5	5	5	5	10
VII		2	1	1	0	3	1	3	1	4
VIII		2	0	2	1	2	3	4	1	5
IX		0	0	0	0	0	0	0	0	0
I		5	0	3	3	5	6	8	3	11
II		1	0	0	0	1	0	1	0	1
III		5	0	5	2	10	7	10	7	17
IV	ALTERNATIVE	0	0	1	1	3	2	1	4	5
V		0	3	1	2	3	3	1	5	6
VI		3	0	2	4	3	6	5	4	9
VII		3	0	3	0	3	3	6	0	6
VIII		1	0	0	0	1	0	1	0	1
IX		0	1	2	2	1	4	2	3	5
I		8	4	5	7	12	12	13	11	24
II		2	1	0	0	3	0	2	1	3
III		8	9	5	5	17	10	13	14	27
IV	TOTALS	1	4	2	1	5	3	3	5	8
V		1	4	1	2	5	3	2	6	8
VI		6	2	4	7	8	11	10	9	19
VII		5	1	4	0	6	4	9	1	10
VIII		3	0	2	1	3	3	5	1	6

- (b) (i) critical and negative,
(ii) neutral,
(iii) reassuring,
(iv) encouraging.

- (c) (i) very helpful,
(ii) fairly helpful,
(iii) not very helpful,
(iv) not at all helpful.

QUESTION	COURSE	EXPERIMENTAL GROUPS				EXPERIMENTAL GROUPS COMBINED				COURSE TOTALS
		AUDIO		VIDEO		AUDIO TUTOR NO TUTOR	VIDEO TUTOR NO TUTOR	TUTOR AUDIO VIDEO	NO TUTOR AUDIO VIDEO	
		TUTOR	NO TUTOR	TUTOR	NO TUTOR					
(b)	I	0		0				0		0
	II	0		0				0		0
	III	4		2				6		6
	IV	4		5				9		9
(c)	STIRLING									
	V	4		6				10		10
	VII	3		1				4		4
	VIII	1		0				1		1
	IX	0		0				0		0
(b)	I	0		0				0		0
	II	2		0				2		2
	III	2		1				3		3
	IV	4		7				11		11
(c)	ALTERNATIVE									
	V	4		6				10		10
	VII	3		2				5		5
	VIII	1		0				1		1
	IX	0		0				0		0
(b)	I	0		0				0		0
	II	2		0				2		2
	III	6		3				9		9
	IV	8		12				20		20
(c)	TOTALS									
	V	8		12				20		20
	VII	6		3				9		9
	VIII	2		0				2		2
	IX	0		0				0		0

16. What advice, if any, would you give your staff tutor in order that his comments might be more helpful?

22. List the criteria which contributed to your answer to question 21.

APPENDIX P

QUESTIONNAIRE TO STUDENTS

SPRING SEMESTER 1973

SAMPLE RESPONSES

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONPRIMARY TEACHING PRACTICE 1973 - QUESTIONNAIRE

During the teaching practice just completed, you were given the opportunity to practise, during a ten-minute period, in the classroom, questioning abilities which you had previously practised in microteaching.

Giving supporting reasons whenever possible, indicate the ways in which the classroom situation extended and/or limited your attempt to practise these abilities.

The most striking difference between microteaching and the classroom lesson, is of course, the number of children taking part; and also the rather more "natural" as opposed to "false" situation they are placed in. With more children attempts at practising questioning skills, in particular, necessarily took longer, as each answer is important and valuable to the discussion.

Discipline, which had caused no real problem in microteaching, became rather more necessary even if it was merely a question of controlling the answers to the questions and directing the discussion. In the classroom situation, the teacher (student) had to become a more mobile conductor as distinct from a static "probe" for various types of responses for the children.

In the classroom, the different procedures for questioning we had specifically practised in microteaching, seemed to fade into the background and became almost instinctive instead of premeditated. This is good as the highly streamlined questioning of the microteaching could be disposed of without the loss of a consciousness about the type of question being asked, and the type of question needed at any time.

UNIVERSITY OF STIRLINGDEPARTMENT OF EDUCATIONPRIMARY TEACHING PRACTICE 1973 - QUESTIONNAIRE

During the teaching practice just completed, you were given the opportunity to practise, during a ten-minute period, in the classroom, questioning abilities which you had previously practised in microteaching.

Giving supporting reasons whenever possible, indicate the ways in which the classroom situation extended and/or limited your attempt to practise these abilities.

In the microteaching context our limited number of pupils have to be coaxed and prodded into co-operation and the practise of individual skills varies according to the ability of the pupils with which one is faced. There is a difficulty in this situation in limiting oneself to the practise of a certain skill.

I found the experience of teaching a large class initially rather terrifying but, in practise very interesting. The skills which we had previously practised did not spring to mind to be practised, but I did find myself using them, often unconsciously. Whereas within the microteaching context one has to draw the children out, in the classroom the pupils were only too keen to offer their opinions, answer any questions and form their own questions. I took a history lesson with the girls of Primary 7 which concentrated on the role of women, living conditions, hygiene and medicine from Saxon times to the present day. In this particular lesson I must have used all the skills and the question was enjoyed by the children. I had little difficulty forming questions whether they were simply for feedback, or higher order questions to relate the past with the present.

The skills which we practised in the microteaching context are difficult to identify separately in a classroom context because there are so many influences working on both the pupil and the teacher, but I do think that they are necessary in the classroom context.