

Students should fill in Sections A and C in BLOCK LETTERS and include this sheet each time an assignment is submitted.

MURDOCH UNIVERSITY

EXTERNAL STUDIES UNIT

19 APR 1977

Date Received

## SECTION A

Course

461

Assignment No.

2

Assignment Title

Classroom Problem

Student Mr/Mrs/Miss/Ms

Pugh

SURNAME

P

INITIALS

Tutor

Renato Schiebel

NAME (BLOCK LETTERS)

## SECTION B

## TUTOR'S COMMENTS

You've misunderstood the purpose of this exercise. This no doubt arises from the "second hand" nature of the investigation.

The exercise was designed to place a particular classroom exercise in focus. Little theoretical treatment was expected at this stage - this was expected in the assignments 3+4.

The analysis you have presented is however, very thorough.

PS Will return tapes separately

Assessment

3-

Tutor's Signature

R Schiebel

Date

24.4.77

Note to Tutor: When this section is completed, please return to External Studies Unit with assignment.

## SECTION C

NAME

D Pugh

Student's Name

ADDRESS

Christ Church Grammar School  
Claremont 6010; Perth

and Address

for Return Mail.

Donald E. Pugh

*Does a problem have to be discovered ???!*

Discovering and Analyzing a Classroom Problem

Classroom Studies 461,

School of Education.

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## INTRODUCTION.

Amidst the hustle and bustle of classroom teaching, lesson problems are difficult to identify and to clarify. Evaluation design and instrumentation are essential in modifying and improving teaching processes. This essay presents a means to evaluate and identify a specific problem in an economics lesson on the nature of production and the firm, taught to grade 11 students at Christ Church Grammar School. The problem identified focuses on the mismatch of the cognitive level of questions asked during class, in comparison with the cognitive levels of normative objectives chosen to represent an optimal lesson. Research on the effects of various cognitive levels of questions is presented as well as instrumentation for evaluating the levels of classroom questions.

## IDENTIFICATION OF PROBLEMS.

Systems analysis presents an useful design for problem identification. A lesson contains in microcosm all the elements of a system: a sum total of variables, (teaching methods, subject content, etc.) optimally and systematically working together to achieve a goal based on needs. (Oliver in Burns, 1973, p. 71) (Saylor, 1974, p. 23) Of course a lesson is but a task in the course and must be seen as the smallest unit, or the end point in defining needs to contribute to the resolution of the overall course problems. (Kaufman, 1972, p. 14.) Method/means analysis lists and relates all possible ways of meeting lesson needs, from which a selection is made of the optimal organization of content, teaching methods and equipment to achieve task objectives.

Implementation of the chosen means occurs next, and evaluation of the congruency between means and objectives permits an identification and rectification of any lesson problems.

#### DETERMINATION OF OBJECTIVES.

Determination of lesson objectives have been based on Emans' (1966) conceptual framework. Emans begins his structure with values filtered through the needs of society, the school, the learner, the learning theory and the nature of the subject content.

Educational theory for the economics curriculum at Christ Church Grammar is Formalist in nature. (Hill, 1966, p. 43.) It stresses the unique road to truth travelled by the economics vehicle. Society and school needs tend to stress academic excellence, viz the cognitive skills needed for university entrance. Students are from middle class homes, with well developed motivation towards examination achievement bolstered by peer and parental pressures. Subject content demands both low level recall and higher level cognitive skills based on the concept of allocating scarce resources to satisfy unlimited wants. Teacher's skills include intensive training in economics combined with restraints in both time and resources available for lesson preparation and implementation.

From these considerations, task oriented objectives have been determined, based specifically on content from Gallagher and Burkhardt (1971), and spread to cover Bloom's and Krathwohl's

taxonomy (Hooper, 1975, pp. 281 to 298.) of cognitive and affective goals. Although there are at least three cognitive <sup>taxonomic?</sup> scales in use (Dunkin, 1974, p. 232.), Bloom's has been chosen as the most familiar. His dictum on the necessity of stressing higher level objectives has been followed; so that the objectives for the lesson range from the simple concrete low level recall to higher level operations involving greater difficulty, complexity, and abstraction in thought. Higher thought processes have been urged on the theory that they are linked with the development of critical thinking (Smith, 1974) and data processing; skills suitable for the knowledge explosion and growing <sup>sc</sup>obsolescence of factual knowledge. (Firth, 1973, passim.)

LESSON OBJECTIVES: PRODUCTION AND THE FIRM.

A. KNOWLEDGE

1. Students will state the names of three kinds of firms, four resources, and the income from each resource.

2. Students will state definitions of production, means of production, capital, unlimited liability, and economies of scale.

B. COMPREHENSION

Students will identify and discover from their definitions examples of processes of production, capital, resources, types of firms and incomes related to different types of resources.

C. APPLICATION

In a short essay students will apply the concepts of production and the firm to the operation of the school canteen.

↓  
 this would  
 have been  
 better  
 presented  
 as an  
 appendix

D. ANALYSIS

Students will be expected to analyze and explain constituent economic elements of production, capital, investment, economies of scale and the firm through an examination of a major local industry.

E. SYNTHESIS

Students should be able to put together a simulation game based on the creation of an imaginary firm with its goal of profit maximization, and with its problems and costs of resources.

F. EVALUATION

Students should possess the verbal ability to evaluate the usefulness of production, resources, and capital to the success of the Australian free enterprise system.

G. AFFECTIVE ANALYSIS

Students should indicate a willingness to:

1. learn about economic concepts connected with production.
2. to respond actively in class answering and discussing questions.
3. to express a positive attitude towards industry and one's relation to it.
4. and to organize this value within a generalized value structure of the modified free enterprise economy and to accept this structure as optimal for the Australian way of life.

*individually tested?*  
These affective aims may be tested by having students compare five advantages of production today with a subsistence economy, and similarly by comparing and evaluating production in our economy with production in a 'command economy'.

Further self actuation skills (Rowntree, 1974, p. 25.) which might also be assisted by the lesson include; improvement in self confidence and oral fluency, and perception of the individual as a cooperating group member.

IMPLICATIONS OF VARYING THE COGNITIVE LEVELS OF QUESTIONS.

From alternative means of implementing the lesson, the didactic method was chosen as the best means to review maximum material in minimum time. Questions have traditionally proven successful in motivating and sustaining interest, in developing and modifying attitudes, in stimulating thinking ability, in eliciting such cognitive processes as inductive and deductive reasoning and in facilitating fresh approaches to problem resolution. (Lowery, 1975, p. 3 et seq. )

Research has shown that questions can be analyzed reliably in terms of their cognitive level, (Davis, 1960) and that teachers can be trained to ask questions at different levels. (Murray, 1971)(Dunkin, 1974, p. 270.) Questions used in the lesson may be analyzed for their level, and compared with an analysis of the levels of the cognitive goals. For optimal efficiency in systems operation, there must be congruency between the educational needs, defined by the objectives and the questions.

To date, research into the desired cognitive levels of questions on retention of data, critical thinking and personal growth of students have offered inconclusive, and indeed, contradictory results. (Dunkin, 1974, p. 237) (Rogers, 1970) Nevertheless, the trend is to illustrate a connection between cognitive level of questions and the contingent

cognitive level of student response in terms of their length, syntax and abstractness. (Cole, 1973, p. 143.) Many researchers agree that the asking of higher level questions stimulates a more complex, abstract response which requires greater length and syntactical complexity.

(Murray, 1971, <sup>3</sup> (Dunkin, 1974, p. 270.) Often, researchers have found evidence, admittedly of a contradictory nature, that high level questioning develops problem solving among young children, (Turner, 1975) critical thinking, and improved interpretation, analysis and synthesis of information.

(Smith, 1974, <sup>3</sup> (Kleinman in Lowery, 1975, p. 45.)  
p. 63)

Ryan (1973) explains that high level questioning also stimulates low level recall since students have both to recall the data, and to marshal and to accommodate facts into an organizing structure subsequent to responding to high level questions. Students exposed only to low level questioning, often fail to perceive any higher level connections, and consequently perform poorly when exposed to higher level questions.

It has also been found that teachers, by purposively moving questions from narrow, convergent thinking to broader, open ended or divergent thinking can encourage in students a degree of creativity. Convergent questioning in highly structured situations demands the recall of specific predictable information. Divergent questioning is freer and permits marshalling of ones ideas in a creative manner so as to take a new perspective or to arrive at a novel solution. (Dunkin, 1974, p. 251.)

#### A QUESTION CLASSIFICATION PLAN.

To determine the success of the economics lesson, it is necessary to

categorize and quantify its questions. Although there are over ten question classification categories now in use, (Ryan, 1973, p. 63) Lowery (1975) presents the simplest method. Lowery integrates Davis and Tinsley's (Dunkin, 1974, p. 236.) Question Inventory with Aschner-Gallagher's methods. (Dunkin, 1974, pp. 247 to 251.) All questions are placed in one of the three categories of 1. miscellaneous, 2. narrow or 3. broad questions.

Miscellaneous questions correlate with Davis' procedural questions that deal with management, behaviour, or organization.

Narrow questions are either 1. direct questions or 2. focusing questions. Direct questions re-emphasize the learning of a previous lesson, or establishes a base of information for new knowledge. These questions involve memory, and are characterized by the words; who, what, where, when, and how much.

Focusing questions develop ideas, compare, contrast, associate or explain relationships. Answers derive from clues, analysis and induction. To respond, students must know certain facts and put them together.

Broad questions are openended and are either 1. valuing or 2. divergent questions. (cf: Aschner-Gallagher's classification in Dunkin, 1974, p. 251.) These questions allow students to explore and discover other explanations. They are used for synthesis, hypothesis, and involve deduction or predicting skills and organization of elements.

Valuing questions include both cognitive and affective evaluation

and are used to organize information, formulate opinions, justify choice, and defend positions.

QUESTION ANALYSIS: ITS IMPLICATIONS.

All questions from the lesson have been transcribed (Appendix A) and analyzed according to Lowery's categories. The analysis appears in the matrix below.

CLASSIFICATION OF QUESTIONS

Question Number	Narrow			Broad	
	Miscellaneous	Direct	Focusing	Valuing	Divergent.
1		x			
2			x		
3		x			
4			x		
5		x			
6		x			
7		x			
8			x		
9		x			
10		x			
11			x		
12			x		
13		x			
14		x			
15		x			
16			x		
17			x		
18			x		
19		x			
20		x			
21			x		
22		x			
23		x			
24		x			
TOTAL	0	15	9	0	0

PROFILE GRAPH SHOWING QUESTION CATEGORIES.

No. Questions:	0	2	4	6	8	10	12	14	16	18	20	22	24
Misc:	_____												
Direct:	XXXXXXXXXXXXXXXXXXXXXXXXXXXX												
Focusing:	XXXXXXXXXXXXXXXXXXXX												
Valuing:	_____												
Divergent:	_____												
Percentage	0%	25%	50%	75%	100%								

Results presented in the profile graph above, indicate that nearly sixty-five percent of the questions asked were direct, and the remaining thirty five percent were focusing. There were no open ended valuing, or divergent questions. Flanders has noted that two thirds of all classroom time is devoted to talk, two thirds of the talk is by the teacher, and two thirds of teachers talk consists of direct influence. (Dunkin, 1974, p. 53.) Students are consequently given very little opportunity in class to exercise higher level thinking, to evaluate, and to think creatively. Stress of the lesson is on a highly structured, prescriptive, low level recall of information. Tinsley (1970) has noted that emphasis on content causes students to view the teacher as a decision maker, whose decisions are accepted uncritically. Trivial questions and questions emphasizing facts, that the students should learn at home, make for a meager intellectual atmosphere which may stifle motivation and destroy creativity.

Such findings parallel other research. A 1967 analysis of 1,347 questions used in classrooms found that 7% of the questions were capable of stimulating reflection, and 6% were likely to increase thinking. 43% of the questions were memory type, 23% involved recall of specific facts, 9% were direction giving, and only 8% involved criticism and evaluation. (Lowery, 1974.) Tinsley (1970) found that even teachers engaged in process oriented enquiry lessons tended towards memory questions. Davis' (1960) teachers also used more memory questions, with interpretation and transformation questions second on the list.

#### CONCLUSION.

Clearly lessons in a discipline aimed at critical thinking and applying the methodology of economics to problem solving at the senior level, must employ more higher level questions than the lesson cited. It is suggested, following Taba's cognitive theory, (Dunkin, 1974, p. 256.) that questions follow a developmental sequence in cycles from simple concrete operations to more complex abstract operations.

Some warnings, however, are in order. Godbold (1973) has found great success in reducing the number of questions at the lowest level, but has had limited success in obtaining "substantial and precise" questions near the top of Bloom's hierarchy.

Ryan warns (1963) that care must be taken that responses to high level questions are not simply recalls; <sup>(and that)??</sup> memorized responses from the day before involving the production of low level thinking activity.

No attempt is made in this study to suggest an ideal proportion of low level and high level questions. Beisenherz (1974) stresses the need for both factual cognitive questions as well as high level questions, while Lowery urges a balance among the various levels of questions.

The solution for determining optimal question levels lies in an application of systems technology already outlined. (supra p. 1/) A systems analyst would identify and list numerous questions dealing with each need to be satisfied. These questions which best fitted the objectives of the lesson would be chosen and sequenced. The balance of cognitive levels of the questions logically should reflect the cognitive levels of the educational objectives which in turn are reflections of the educational theory and its constraints. Feedback from formative or process evaluation would permit modifications of the questions until congruence was finally obtained between the cognitive level of the questions and the cognitive level of the objectives. Optimality would thus be reached and the problem eliminated.

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