AN EXPERIMENT IN INSTRUCTION FOR ADULT SCIENCE EDUCATION

by

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to the required standard

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ABSTRACT

This study is an evaluation of the study-research group technique as it was applied to a program of liberal adult education in New Zealand.

It is argued that techniques of instruction commonly used in the teaching of research-based subjects are largely unsuitable for the achievement of desirable learning outcomes in part time participants. Use of the techniques results in instruction being heavily weighted with verbal information and, in some cases, motor skills or middle-order intellectual skills. The resultant learning is of little practicable value to the adult students; a situation which is instrumental in the present poor state of science adult education.

The thesis is developed that, to be relevant to the needs of adults, instruction in the sciences should concentrate on the development of a critical attitude to science, and of higher-order intellectual skills and cognitive strategies appropriate to systematic and scientific solution of problems. Prerequisite verbal information and motor skills should be learned only as they are required for the solution of a problem. The study-research group technique has been proposed as one which could, theoretically, meet these requirements.

The program in which the technique was evaluated involved six groups of adult students. The research framework for the instruction was an environmental survey of an area proposed for development as a regional recreation reserve, research being directed toward the drafting of recommendations on development and management of the area. Each of the groups researched one of the following aspects of the area: history, geology, botany, freshwater biology, ornithology, and mammalogy.

The evaluation instrument used was a post-course questionnaire. Items in the questionnaire elicited information on: participant personal attributes;
socio-economic and educational background; preferred structuring of such programs; course entry motivations and realization of associated expectations; and responses about the extent to which the technique achieved the desired learning outcomes and conformed to generally accepted principles of good adult education (e.g. ensuring high motivation to learning; ensuring active involvement in learning).

Particular analytic attention was given to an examination of the influences of participant background variables on the participant scoring of learning outcomes and adult education principles. Factor analysis was used to identify motivational and participational factors which were compared and related to group membership.

Analysis revealed that the participants were disproportionately representative of the higher socio-economic and better educated sectors of the community. Nevertheless, on most participant background items, a wide range was represented in each group. The results of the evaluation support the premise that the study-research group technique effectively can achieve the intended learning outcomes while conforming to accepted adult education principles. It also was concluded that the technique provided for meaningful learning by individuals of widely varying backgrounds. There was, however, some evidence that participants who had studied previously in the discipline of their group, through university extension or the Workers Education Association, derived most benefit from the course.

Meaningful motivational and participational factors were identified, and appeared to be complementary, rather than alternative, measures of participant attributes. Three such factors discriminated among group membership. The botany and geology groups, and the botany and freshwater biology groups were found to be most closely related.

Participant preferences in relation to program structure, generally
were closely identifiable with the practice in the program. However, some incongruence was found which could have had a negative effect on evaluation scores. This particularly derived from: the failure of the program brochure to indicate to some participants the extent of the time commitment expected of them; a general desire for more discussion between groups; an expressed preference of several participants for shorter meetings; and insufficient involvement of participants in decision-making within some groups.

Of the seven general research hypotheses which were tested in this evaluation, five were confirmed. The failure to identify a close relationship between motivational and participational factors weakened the confirmation of one hypothesis, and the finding of some incongruence between participant preferences and programming practice weakened confirmation of the final one.

It is concluded that the theoretical values of the technique generally are substantiated, but that additional, more objective and sequential testing should be undertaken of the technique in a range of programs using alternative methods.
# Table of Contents

## LIST OF TABLES

| LIST OF TABLES | ix |

## LIST OF FIGURES

| LIST OF FIGURES | xi |

## ACKNOWLEDGEMENTS

| ACKNOWLEDGEMENTS | xii |

## Chapter

### I. INTRODUCTION

- I. NATURE OF THE PROBLEM ................. 1
- II. PURPOSE OF THE STUDY .................... 3
- III. RESEARCH PROCEDURE ...................... 4

#### The Program Being Studied

- The Program Being Studied .................. 4
- The Evaluation Instrument .................. 5
- Research Hypotheses ........................ 6
- Analysis of the Data ....................... 7

### II. CONCEPTUAL BASIS TO THE STUDY

- I. ADULT EDUCATION AND PROGRAM .......... 8
- II. THE NEED FOR NEW APPROACHES TO SCIENCE TEACHING .... 11

#### The General Need

- The General Need .......................... 11
- The New Zealand Situation ................ 11
- The Field of Science Adult Education ..... 12

#### III. LEARNING THEORY IN ADULT EDUCATION

- Introduction ................................ 15
- Gagné's Learning Systems Theory .......... 17
- Discussion .................................. 23

### IV. PROCESSES OF ADULT EDUCATION

- Introduction ................................ 25
- The Classification of Techniques .......... 26
- The Study-Research Group Type ............ 30
- The Generalizability of Process in Adult Education 35
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Relationship Between Techniques and Learning Outcomes</td>
<td>36</td>
</tr>
<tr>
<td>Analysis of Research-Based Education in Terms of Learning Outcomes</td>
<td>39</td>
</tr>
<tr>
<td>V. PRINCIPLES OF ADULT EDUCATION IN THE DESIGN AND MANAGEMENT OF INSTRUCTION</td>
<td>45</td>
</tr>
<tr>
<td>Introduction</td>
<td>45</td>
</tr>
<tr>
<td>Commonly Identified Principles of Adult Education</td>
<td>46</td>
</tr>
<tr>
<td>Additional Guidelines for Adult Instruction</td>
<td>57</td>
</tr>
<tr>
<td>Discussion</td>
<td>58</td>
</tr>
<tr>
<td>VI. PARTICIPANT BACKGROUND AND PARTICIPATION</td>
<td>60</td>
</tr>
<tr>
<td>The Adult Education Participant</td>
<td>60</td>
</tr>
<tr>
<td>The University Extension Participant in New Zealand</td>
<td>61</td>
</tr>
<tr>
<td>VII. MOTIVATIONAL FACTORS IN ADULT EDUCATION</td>
<td>65</td>
</tr>
<tr>
<td>Introduction</td>
<td>65</td>
</tr>
<tr>
<td>Motivational Factor Studies Based on Houle's Typology</td>
<td>66</td>
</tr>
<tr>
<td>Research Extending Motivational Factors</td>
<td>70</td>
</tr>
<tr>
<td>Motivational Factors in Relation to Science Adult Education</td>
<td>72</td>
</tr>
<tr>
<td>The Relationship Between Motivation and Interest</td>
<td>73</td>
</tr>
<tr>
<td>VIII. PROGRAM DESIGN AND PUBLICITY</td>
<td>74</td>
</tr>
<tr>
<td>IX. SUMMARY AND RESEARCH HYPOTHESES</td>
<td>75</td>
</tr>
<tr>
<td>Summary</td>
<td>75</td>
</tr>
<tr>
<td>Research Hypotheses</td>
<td>76</td>
</tr>
<tr>
<td>III. METHODS</td>
<td>81</td>
</tr>
<tr>
<td>I. THE EVALUATION INSTRUMENT</td>
<td>81</td>
</tr>
<tr>
<td>II. VARIABLES USED IN THE ANALYSIS</td>
<td>83</td>
</tr>
</tbody>
</table>
Chapter Page

III. ANALYSIS OF THE DATA .................................................. 84

IV. RESULTS ................................................................. 87

I. CHARACTERISTICS OF THE PARTICIPANTS .................. 87

   Sex ................................................................. 87

   Age ................................................................. 87

   Socio-Economic Status ..................................... 87

   Educational Background ................................... 90

   Conclusions ..................................................... 95

II. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO THE LEARNING OF RESEARCH-BASED CONTENT ..................... 97

III. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PRINCIPLES OF ADULT EDUCATION ................................. 101

IV. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PARTICIPANT BACKGROUND ................................. 105

V. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO COURSE-ENTRY MOTIVATIONS ................................. 111

VI. MOTIVATIONAL FACTORS ........................................... 113

VII. PARTICIPATIONAL FACTORS ...................................... 119

   Identification of Factors .................................... 119

   Relationship Between Motivational and Participat-
   tional Factors .................................................. 124

   Factors in the Identification of Group Membership .. 127

   Summary .......................................................... 130

VIII. PROGRAM DESIGN AND PUBLICITY ............................. 131

   Course Reading Material ................................... 131

   Group Size ....................................................... 131

   Intergroup Contact ............................................ 132

   Scheduling of Meetings ...................................... 132
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Meetings</td>
<td>132</td>
</tr>
<tr>
<td>Length of Course</td>
<td>133</td>
</tr>
<tr>
<td>Structuring of the Course</td>
<td>133</td>
</tr>
<tr>
<td>Adequacy of the Program Brochure</td>
<td>135</td>
</tr>
<tr>
<td>Course Planning Guidelines</td>
<td>135</td>
</tr>
<tr>
<td>Conclusions</td>
<td>136</td>
</tr>
<tr>
<td>V. CONCLUSIONS</td>
<td>138</td>
</tr>
<tr>
<td>I. CHARACTERISTICS OF THE PARTICIPANTS</td>
<td>138</td>
</tr>
<tr>
<td>II. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO THE LEARNING OF RESEARCH-BASED CONTENT</td>
<td>139</td>
</tr>
<tr>
<td>III. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PRINCIPLES OF ADULT EDUCATION</td>
<td>139</td>
</tr>
<tr>
<td>IV. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PARTICIPANT BACKGROUND</td>
<td>140</td>
</tr>
<tr>
<td>V. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO COURSE-ENTRY MOTIVATIONS</td>
<td>140</td>
</tr>
<tr>
<td>VI. MOTIVATIONAL FACTORS</td>
<td>141</td>
</tr>
<tr>
<td>VII. PARTICIPATIONAL FACTORS</td>
<td>142</td>
</tr>
<tr>
<td>VIII. PROGRAM DESIGN AND PUBLICITY</td>
<td>142</td>
</tr>
<tr>
<td>IX. SUMMATIVE CONCLUSIONS</td>
<td>143</td>
</tr>
<tr>
<td>VI. IMPLICATIONS AND RECOMMENDATIONS</td>
<td>146</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>152</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>162</td>
</tr>
<tr>
<td>A. Description of the Program Being Studied</td>
<td>162</td>
</tr>
<tr>
<td>B. Letter Accompanying Questionnaire</td>
<td>167</td>
</tr>
<tr>
<td>C. The Questionnaire</td>
<td>169</td>
</tr>
<tr>
<td>D. Numbered List of Variables Used in Factor Analyses</td>
<td>178</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

Table | Page
---|---
1. Gagné's phases of learning, processes of learning, phases of instruction, influencing external events, and instructional events of a learning task | 20
2. Gagné's learning outcomes in relation to prerequisite learning, instructional features, and critical learning conditions | 21
3. Classification of techniques using the criteria noted in Figure 1 | 29
4. Suitability of technique types in relation to learning outcomes, as identified by selected authors | 38
5. Theoretical suitability of techniques for achieving the critical learning conditions associated with each learning outcome | 40
6. Matrix of adult education principles and authorities | 47
7. Motivational factors identified by selected authors | 68-69
8. Usable questionnaire returns in relation to the total enrolment in each group | 83
9. Ratios by socio-economic class of: 1) general extension enrolment and the Wellington urban population, 2) early study-research group participants and the Wellington urban population, and 3) participants in the present program and the New Zealand adult male population | 91
10. Response to questionnaire items relating to learning outcomes | 98
11. Correlation coefficients between learning outcome scores | 99
12. Correlation coefficients among attendance, group membership, and the learning outcome scores | 100
13. Participant evaluations of the extent to which the project realized the principles of adult education | 102
Table

14. Correlation coefficients among scoring of adult education principles .................................................. 102
15. Chi square values and probabilities of participant-characteristic variables in relation to group membership .......... 105
16. Horizontal percentage of group membership in relation to research background ............................................. 106
17. Horizontal percentage of group membership in relation to previous formal non-credit study in the discipline of the group...... 107
18. Correlation coefficients between participant-characteristic variables, and the learning evaluation and response scores ...... 109
19. Course-entry motivational items and correlation coefficients with satisfaction of the expectations ........................................ 112
20. Motivational factors identified from the seventeen items ........ 114
21. Participational factors identified with orthogonal rotation ...... 120-121
22. Correlation coefficients between factor loadings on the orthogonally rotated participational and motivational factors .......... 125
23. Differentiability among six study-research groups ................. 128
24. Classification of participants into study-research groups, based on canonical variables developed in the stepwise discriminant analysis .......................................................... 129
25. Classification of participants into study-research groups using Cooley and Lohnes centroids .................................. 129
26. Recommendations for improvement of program and instructional processes .......................................................... 134
27. Response to items regarding the adequacy of descriptive information in the pre-enrolment brochure .................................. 134
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tentative classification of technique categories</td>
<td>31</td>
</tr>
<tr>
<td>2. Learning outcomes in relation to research-based education</td>
<td>41</td>
</tr>
<tr>
<td>3. Age distribution of four groups: the participants, the university extension enrolment in 1969, the adult population of the Wellington urban area, and the earlier study-research group participants</td>
<td>88</td>
</tr>
<tr>
<td>4. Socio-economic status distribution of participants compared with the New Zealand adult male population</td>
<td>89</td>
</tr>
<tr>
<td>5. Highest academic qualifications of four groups: the participants, the New Zealand adult population, the general university extension role, and the earlier study-research group participants</td>
<td>92</td>
</tr>
<tr>
<td>6. Previous credit education in the discipline of the study-research group</td>
<td>93</td>
</tr>
<tr>
<td>7. Previous non-credit (adult) education in the discipline of the study-research group</td>
<td>93</td>
</tr>
<tr>
<td>8. Total number of previous adult education (non-credit) courses taken in all subjects</td>
<td>94</td>
</tr>
<tr>
<td>9. Organizing institution for previously taken adult education courses</td>
<td>94</td>
</tr>
</tbody>
</table>
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CHAPTER I

INTRODUCTION

I. NATURE OF THE PROBLEM

The instruction of research-based content in general, and of sciences in particular, is a poorly developed component of adult education. Most educational offerings in this area reflect a failure to take the needs of society or of the adult participants into proper account. They are based on the transmission of segments of knowledge, most of which is only of marginal historical value to the learners, and which is not related at all to the solution of present-day problems. Some courses, namely those in which laboratory experiemnts or field projects are included, place greater emphasis on the acquisition of selected motor skills and certain intellectual skills (generally below the level of true problem solving).

Since these adult education procedures reflect the curricula throughout the formal components of the educational institution, it is reasonable to conclude that by far the greater majority of the adult population is fundamentally ignorant of science in terms of applying knowledge to the solution of problems which confront them, of critically evaluating the published conclusions of research efforts, and of comprehending the possible biological and sociological effects of the application to societal needs of any scientifically derived development.

If democracy is to function effectively in the interests of its citizens, those citizens must be capable of making sound evaluations of the cultural forces which affect them, and of making their decisions effective in action. It is generally acknowledged, whether one approves of it or not,
that a major component of the cultural pressure in modern society is identifiable with the products and processes of scientific research. If the citizen is unable to evaluate those products and how they might affect other components, or to comprehend the strengths and weaknesses of the processes, how will it be possible for democratic decisions to be made?

The answer, logically, is that decisions of a truly democratic nature are not made since the citizens do not have the necessary input for the decision-making process. The inevitable result of this is the development of opposing pressure-groups, each functioning in what are considered to be the interests of its members. More often than not, however, the members of such pressure groups are intellectually in no better a position to make decisions on the issues of their concern, either than they were as non-members, or than are the other non-participating citizens. Pressure-group membership gathers its own group momentum, whether or not what it argues for is rational or humane. In a democracy, such groups tend to sway public opinion by the same process, and thus become powerful political and decision-making forces, in spite of their general inability to solve properly the problems for which they claim to have the solutions.

This is dysfunctional democracy, and is substantially the expression of democracy in western society today. It is in large part a product of adult ignorance of scientific processes and of consequent ineffectuality in making sensible judgements, and in influencing the direction of societal change with those judgements.

If there is to be any hope of correcting this situation, science education must become relevant to the needs and interests of the citizens. It must give them the capabilities with which they can critically evaluate a new scientific 'discovery,' with which they can make a sensible decision by weighing the forces involved in any particular issue, with which they can
counter the influences of commercialized pseudo-science, and with which they can obtain the necessary knowledge to accomplish these tasks.

That the pre-adult component of the educational institution is failing to meet this goal for all but a small minority of students is manifestly clear. This places the corrective burden within the sphere of adult education where, as already noted, the task is not being met with appropriate means. This is, at least partly, because the appropriate means are not available to the adult educator. The means — techniques of adult education — are generally either not suited to the outcomes desired, or are only effective with full-time or substantially full-time students.

II. PURPOSE OF THE STUDY

This study is an attempt to evaluate an adult education technique which is theoretically suitable for achieving the types of learning outcome advocated in the preceding section.

The process being evaluated has been termed the 'study-research group' technique (Bagnall, 1975) since it centers the learning and instruction around a team effort to solve an original research problem. The team comprises a group of adult students with an experienced research worker as its leader and principal resource person.

While variations of this technique have been used previously with more or less independent learners who were experienced and knowledgeable in their subject (the 'project' process described by Rogers, 1971), the technique only recently has been developed as a structured, group-based procedure suitable for participants with widely varying backgrounds and previous relevant learning.

An earlier evaluation of the technique was undertaken of three
study-research groups, two working in the botanical field, the other geological. Participants in these groups also were largely persons who had experienced previous adult instruction in the subject of their group.

This evaluation is an attempt to determine whether the tentative conclusions drawn from the previous study may be strengthened, on the basis of an additional confirmation, and broadened as to their subject applicability.

III. RESEARCH PROCEDURE

The Program Being Studied

The program (App.A) involved 84 participants (excluding group leaders) distributed among six study-research groups. As the research framework for the program, the groups were using a survey of approximately 2,000 hectares of rugged terrain proposed for use as a regional recreation reserve. The first part of the survey results have already been published (Bagnall, 1976b).

The six study-research groups were organized around different aspects of the environmental evaluation: local history, geology, botany, freshwater biology, ornithology, and mammalogy. Each group was lead by one or two researchers who were selected primarily for their research expertise, and secondarily for their ability to work with adult students. Enrolment was voluntary and without prerequisites except in the case of the ornithology group where applicants were required to possess the capability of identifying the local avifauna by both sound and sight. When enrolling, applicants nominated the group to which they wished to belong and a second choice of group, if they had one. Enrolments were accepted in order of receipt up to a maximum of fifteen in each group, after which applicants were placed according to their second choice.

Pre-course publicity was quite extensive, facilitated by the
novelty and magnitude of the project. Articles appeared in all of the free, local, weekly, house-hold delivery newspapers, and in both of the regional daylies. Also, a discussion of the project was broadcast by a regional radio station. Brochures specifically on the project were mailed to selected interest-groups. The main Extension Department brochure and Department advertisements in the regional newspapers invited persons to request a copy of this brochure which carried a detailed explanation of the project and included enrolment forms. Enrolments were only accepted if they were on the appropriate forms.

For both political and educational reasons a time limit of ten months was placed on the program from initial to final class meeting. Within that period, each group arranged its meeting times to suit the participants and the constraints of the subject matter. Initial meetings of all group participants were held to explain the project, and final meetings were held to discuss and draft recommendations arising out of the research work.

The Evaluation Instrument

Time constraints did not permit pre-course or within-course evaluation in any systematic fashion. Neither was time available at any stage for evaluation using an interview schedule.

The evaluation instrument used in this study was a questionnaire (App.C) mailed to each participant five weeks after the termination of the course. A personal letter (App.B) accompanied the questionnaire. Towards the end of the course specific mention was made, to the participants, of an impending questionnaire, and of the considerable assistance that their completing and forwarding of the questionnaire would be to the university in its future programming. The time lag between course termination and distribution of the questionnaire was intended to give participants time in
which to consider and evaluate their attitudes to the program.

The questionnaire included items on personal attributes, socio-economic variables, previous educational activity, individual response to specific aspects of the technique, and attitudes toward a preferred structuring of future such courses.

Sixty-five usable returns were received (77% of the initial enrolment) and contribute to the body of data.

Research Hypotheses

This evaluation is based on seven general research hypotheses, each with at least one specific hypothesis.

The general hypotheses were directed to testing the following theses:
1) that the technique, as evaluated by the participants, is a satisfactory one for the learning of research-based content;
2) that the technique conforms to important principles of adult education;
3) that the technique can provide, simultaneously in one class, meaningful educational experiences for individuals of widely varying pre-entry educational, biological, and socio-economic backgrounds;
4) that the technique can satisfy a wide range of course-entry motivations;
5) that the motivational orientations of the participants are similar to those identified in other studies;
6) that meaningful participational factors can be identified and related to the motivational factors which together can form a basis for the identification of participants in each study-research group; and
7) that participants express general satisfaction with the program and publicity, in that the type of structure preferred is closely similar to that of the program participated in.
Analysis of the Data

The questionnaire responses were coded and the data punched on to computer cards. A small number of secondary variables — such as socio-economic status — were derived from the primary variables.

Analysis involved the derivation of frequency distributions and means for the scoring on each variable in the questionnaire. Where required, bivariate frequency distributions, horizontal, vertical and total percentages, correlation coefficients and chi square values, with significances, were obtained. Factor analyses were run on the motivational orientation scores and selected variables (App.D) constituting participational items. The correlations between these two sets of derived factors were determined. The extent to which individual factor scores for each factor could be used as an identification of membership in each group was tested by stepwise discriminant analysis. Responses to open-ended questions were clustered on the basis of the attitudes and opinions expressed.
CHAPTER II

CONCEPTUAL BASIS TO THE STUDY

I. ADULT EDUCATION AND PROGRAM

For comparative purposes, the activity being evaluated in this study must be identified correctly in relation to other activities of an educational nature.

To begin at a general level, it can be stated that the activity falls within the field of adult education as defined by Verner (1975, p. 181), "Adult education is any planned and organized activity provided by an individual, an institution, or any other social instrumentality that is intended specifically to assist an adult to learn and which is under the immediate and continuing supervision of an instructional agent who manages the conditions for learning in such a way as to facilitate the successful achievement of the learning objectives."

Approaching the question slightly differently, Essert & Spence (1968) recognize three major systems of education in the community: the family educational system, the sequential-unit system, and the complementary-functional system. It is into this last system which the activity here being studied would fit. The authors define it thus, "The complementary-functional system is primarily focused upon providing systematic learning to meet a particular operational problem of life, not learned or inadequately learned in the family or the sequential-unit system. It is complementary therefore, in two respects: it supplies that learning which is required to meet a deficiency of learning in other systems and it adds to or enhances the maturing potential of the learner in ways the other two systems cannot do." (p. 261).
It is also true that the participants in the activity being studied generally conform to Schroeder's (1970) definition of them as "...anyone who has either discontinued or completed his formal education and is now trying to re-engage in the educational process."(p.39).

The activity in which the process was used is also considered to constitute a program within the field of adult education. Program is defined by Deniston & Rosenstock (1970, p.835) as "...an organized response to eliminate or reduce one or more problems where the response includes one or more objectives, performance of one or more activities, and expenditure of resources ... Any size of enterprise or response could constitute a program." Or by Verner (1964, p.34) as "...a series of learning experiences designed to achieve, in a specified period of time, certain specific instructional objectives for an adult or group of adults."

More particularly, the program can be stated as being of the liberal education type, which is defined by Carey (1961, p.7) as follows,..."Liberal education is education that looks to areas of knowledge traditionally considered liberating — knowledge of the physical and biological world, of oneself and others, of man's achievements and his cultures, of his religions and philosophical heritage. But to be appropriate to adult* education, this definition presupposes organization in terms of the more important themes of adulthood rather than of adolescence. In brief, to the extent that liberal content is modified to take into account the adult's experience, thought patterns, and motivations it is liberal adult education..."

Finally, it should be stated that the evaluation relates not to the program, which is the instructional umbrella, but to the efficacy of the

* Throughout this report, italics within quotes are those of the original author except where otherwise specified.
instructional system in facilitating learning. Peters & Boshier (1976, p.198) make the distinction clear, ..."Program development is concerned with determining desirable educational ends. Instructional design concerns the creation of structures and learning experiences that will be employed to achieve educational ends. The program does not specify the means of achieving educational objectives; however, it provides a framework within which methods, techniques and devices may be selected and used."
II. THE NEED FOR NEW APPROACHES TO SCIENCE TEACHING

The General Need

Adult education writers not infrequently draw attention to the need for improvement in instruction. For example, Boshier (1973), at the conclusion of his paper on participation and dropout, observes, ..."A theme of this paper has been that reasons for non-participation and dropout do not reside exclusively within the participant ... Techniques such as the formal lecture, the mainstay of most university adult education programmes, and conservatively defended, are inappropriate for certain groups. Lectures induce incongruence, actually prevent staff/student and student/student communication and for many courses could be discarded." (p.279).

One of the recommendations made by Faure et al (1972), which reflects a theme running throughout the document, is for the integration of program types and their refocusing on the needs of individuals and society, ..."Rigid distinctions between different types of teaching — general, scientific, technical and professional — must be dropped, and education ... must become theoretical, technological, practical and manual at the same time." (p.195).

Thomas (1964, p.264) makes the comment that ..."The novelty factor should be eliminated from research, not from teaching ... The identification of novelty in what has been in the past a familiar situation stimulates the desire to learn." This is a very pertinent comment, and one which makes the evaluation results of studies such as the present one so difficult to relate to others.

The New Zealand Situation

Since the needs which gave rise to the type of program being studied were those felt within the country of its development — New Zealand — a
brief comment should be made on some aspects of adult education in that country.

While Boshier's comments above may reasonably be applied to the field in New Zealand, some additional comments from the Committee on Lifelong Education (1972) could be noted. With regard to techniques the authors of this report observe, ..."The standard techniques remain: in conceptual fields, lecture followed, hopefully, by discussion; and in skills courses, demonstration followed by practice." (p.86). In addressing programming they recommend that ..."There should also be changes in the scope of courses ... There is and will continue to be proportionately less demand for general survey or introductory courses in single 'subjects.' Adult learners should be more aware of their individual interests and needs, which are rarely likely to be confined to single subjects and even more rarely to extend through the whole field of a subject. The new courses will be often multi-disciplinary or cover quite specific aspects of a subject." (p.87).

If there is cause for disquiet about the adult education field in general, the area of science instruction presents an even greater challenge. Hall (1970), in his review of adult education in New Zealand, described it as "...the most backward phase of adult education in New Zealand today." (p.157).

**The Field of Science Adult Education**

The pressing need for better and more critical adult understanding of modern science is a theme of much adult education writing.

Faure et al (1972, p.148), writing on science education observe, ..."We cannot hope to absorb the knowledge explosion by cramming brains with more scientific facts and by removing outdated subjects from the curriculum. Science must not be turned into a mere scholastic exercise. On the contrary, science teaching should be based on a pragmatic search for solutions to
problems arising out of the environment, either directly from reality or derived from models." The authors also address the area of environmental education. They note, in relation to environmental issues and problems, that ..."Stimulating awareness of such dangers is a demanding new task for education, but particularly appropriate to it for many reasons and, too often, one that is much underestimated."(p.101).

Jeske (1973) develops this last theme specifically in relation to adult education. He recognizes the "...citizens' general lack of knowledge of the direct relationships between natural resources and standards of living in a modern society..."(p.307), but regards as even more serious "...the confusion generated by half-true pronouncements from usually credible sources masquerading as established facts..."(p.307). In response, he suggests that ..."These citizens want and need some sort of framework and the discipline of a structure for learning experiences in the area of environmental improvement; they want to be able to separate fact from fiction about environmental issues and be able to make intelligent decisions on environmental matters. Adult education programs can contribute indeed, they have a great and inescapable responsibility for giving real leadership in helping citizens learn to recognize and evaluate the significance of environmental problems..."(p.308).

Emmelin (1976) notes the importance of field experience in environmental education and makes the observation that ..."The most important of the innovative functions performed by conservation education is its pioneering of combinations of field work, i.e. direct experience of problems, with theoretical studies."(p.48).

White & Kelly (1960) correctly observe the modern need for general adult understanding of science, but fail to make any appropriate recommendations. Indeed, what they suggest more resembles a school curriculum
for studying the products of science, than it does recommendations for adult programming to meet needs in this area.

Hackel (1962) discusses the impact of science on society, and suggests that "...there must be a greater understanding of science on the part of most individuals. But this understanding must go beyond technology and hardware — these are important, to be sure — but the increasingly complex society in which we live requires the deeper understanding of what is and how it operates."(pp.176-177). This understanding must be one "...that transcends mere recall of remote facts and figures and manipulation of obscure formulae."(p.177). Evidently he did not think that much, if any, adult education was appropriately directed at the time of writing, for he suggests that "This is an area where those responsible for adult education might very well do some investigating, and I might add hopefully, some course offering."(p.177).

Bagnall (1977) recognizes the general adult's failure to comprehend the probabilistic nature of research results and conclusions, and asks "...how often in the natural societal setting does one hear or read of research results, even the most recent and tenuous, being other than established fact?" In response to this question he suggests that "With entering so much applied biology/every aspect of our daily living the present, general, naive acceptance of research material must surely be the greatest single modern failure of our educational institution, including the adult education component."
III. LEARNING THEORY IN ADULT EDUCATION

Introduction

The desirability of basing both instruction and its evaluation on a particular learning theory is developed by Knowles (1973) in his discussion of alternative learning theories available to the adult educator. He observes (p.93) that ..."If you aren't clear about what your theory is — or even whether you have one — the chances are that you will end up with a hodgepodge. You will use different theories in different times or situations, or conflicting theories for different decisions in the same situation. You won't know why you are doing what you are doing."

Unfortunately, there is at present a considerable diversity of learning theories from which to choose, and these are not necessarily strictly comparable or equivalent. For, as Dubin & Okun (1973, p.3) observe, ..."At present no single learning theory is applicable in all educational settings." The problem is summarized by Gagné (1976, pp.41-42), ..."Contemporary information-processing theory concerns itself almost exclusively with the learning and retention of verbal information of the sort that is exhibited as propositional knowledge. Other theorists have given attention to other kinds of learning outcomes they see as relevant to school instruction: Bruner to cognitive strategies, Bandura to attitudes, Gagné to intellectual skills."

Houle (1972) approaches the diversity by first identifying a number of 'credos.' He defines a credo as ..."A statement of belief which is not part of any larger system of ideas or conceptions."(p.230). Six credos which tend to define an adult-educator's approach to his task are identified. Houle then presents a number of 'systems' which are essentially conceptual categories of learning theories.
Dubin & Okun (1973) approach the problem in a more systematic fashion in recognizing three principle orientations of the positions currently adhered to by learning theorists. These are stated as —

1. **Behaviorism**: Behaviorists concern themselves with the observables of behavior, namely stimuli and responses. Strictly behaviorist doctrine avoids any speculation about what is going on in the mind.

2. **Neo-behaviorism**: Neo-behaviorists also consider stimuli and responses as the only valid indicators of behavior but they also consider what happens between the input of stimuli and the output of responses in terms of mediational processes.

3. **Cognitivism**: Cognitive psychologists deal with man as a rule forming being and the cognitive structure of the individual is considered to be of paramount importance for learning."

The authors explicate a number of theories in terms of this taxonomy. Those specifically included are: behaviorist — B.K. Skinner's theory based on operant conditioning; neo-behaviorist — C. Hull's drive reduction theory, D. Hebb's neuro-physiological theory, A. Bandura's social learning theory and R.M. Gagné's learning systems theory; cognitivist — J. Bruner's discovery learning, D. Ausubel's reception learning and A.H. Maslow's and C.R. Roger's self-directed learning models.

In choosing a learning theory most suitable for the evaluation and further development of a program such as that being studied here, one is attracted by the relevance of a concept in the writings of Dewey; namely his thesis of experiential learning, ..."Adaptation of the method to individuals of various degrees of maturity is a problem for the educator ... But at every level there is an expanding development of experience if experience is educative in effect. Consequently, whatever the level of
experience, we have no choice but to operate in accord with the pattern it provides or else neglect the place of intelligence in the development and control of a living and moving experience." (Dewey, 1938, p.112).

Another important concept to Dewey was that of the democratic social purpose of education (Dewey, 1916), which strongly influences Knowle's 'andragogical theory of adult learning' (Knowles, 1973).

Dewey's experiential basis of 'scientific thinking' is further developed by Bruner in his theory of 'discovery learning' (Bruner, 1960 & 1966). The instructional process in the program being evaluated leans strongly toward Bruner's 'hypothetical mode' of teaching, where "...the teacher and the student are in a more cooperative position ... The student is not a bench-bound listener, but is taking part in the formulation [of the instruction] and at times may play the principal role in it." (Bruner, 1960, p.26).

However, these theories suffer particularly, as noted above, from being based on a limited range of learning outcomes. If evaluation is to be based at least on the outcomes of learning, a more inclusive set of these is required. One such approach is that pursued by Bloom (1956) who has identified a comprehensive range of educational objectives based on the results of learning tasks.

Gagné provides an even more instructionally functional approach by providing a theory of learning and instruction which links types of learning to both learning processes and learning outcomes.

**Gagné's Learning Systems Theory**

Gagné (1965) identifies eight distinct types of learning, each with its own set of required conditions. These are hierarchical in that each subsequent type requires those before it as prerequisites. The eight types, with a summary of the concept of each, are as follows —
1. Signal learning. Where the individual learns to make a general, diffuse response to a signal.


3. Chaining. In which the learner acquires a chain of two or more stimulus-response connections.

4. Verbal association. Which is the learning of verbal chains.

5. Multiple discrimination. The ability to discriminate between stimuli which may resemble each other to varying degrees.

6. Concept learning. Acquiring the capability of making a common response to a class of stimuli the members of which may differ widely from each other in physical appearance.

7. Rule learning. Where sequences of two or more concepts are learned.

8. Problem solving. Commonly termed 'thinking.' Two or more previously learned rules are combined into a new capability which is based on a higher-order principle.

From the basis of these learning types, Gagné develops his theory through a model of the internal processes of learning. The model may be described thus, ..."In brief, the model depicts the following flow of information from one hypothesized structure to another: a stimulus input from the receptors enters the sensory register (a very short-lived memory store), and then the short-term memory, where it persists for about thirty seconds or less. Rehearsal by the learner can maintain information here for longer periods. It is then coded for storage and transferred to the long-term memory, assumed to be a permanent repository. Later the information is retrieved following a search, and when recovered is transferred again to the short-term memory. At this point its appropriateness is considered, resulting in a decision for further search, or for the
generation of responses that result in the performance, by activation of
the response generator. Important components of the model are the executive
control processes, by means of which various kinds of information transfer
are activated and modified. A similar function may be proposed for
expectancies established in preparation for an act of learning." (Gagne, 1976,
p.23).

Fundamental to the theory is the distinction between the internal
processes of learning and external stimuli, as stated by Gagne (1975, p.44)
"...The internal processes of learning may be influenced by external events
— stimuli from the learner's environment ... These external events, when
they are planned for the purpose of supporting learning, are called by the
general name of instruction."

Eight processes of learning are recognized (Table 1). These are
collectively defined as "...the processes involved in learning, retention,
and transfer of learning." (1976, p.22). Each of these processes operationalizes a learning phase (Table 1). The phases are defined as "...the sequence of transformations brought about by these processes." (1976, p.22). The same set of phases is recognized by Gagne as comprising 'phases of instruction,' "...It seems reasonable, therefore, to distinguish as successive phases of instruction those interactions to external stimulation
and learning processes that can clearly alter the course of learning.
Designating instructional phases in this way helps to emphasize the
function of instruction as supportive of learning and thus to suggest the
variety of tasks involved in teaching." (1976, p.28).

The key external events which influence learning in each instructional
phase are shown in Table 1 together with the categorization of these into
'instructional events.'

The second dimension of Gagne's theory is that defined by the 'type
of expected outcome' of learning (Table 2), i.e. the "...capabilities and
<table>
<thead>
<tr>
<th>Phase of Learning</th>
<th>Process of Learning</th>
<th>Phase of Instruction</th>
<th>Influencing External Events</th>
<th>Instructional Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. motivation</td>
<td>expectancy</td>
<td>motivation</td>
<td>a) communicating the goal to be achieved; or b) prior confirmation of expectancy through successful experience</td>
<td>1. activating motivation 2. informing learner of the objective</td>
</tr>
<tr>
<td>2. apprehending</td>
<td>attention; selective perception</td>
<td>apprehending</td>
<td>a) change in stimulation to activate attention; b) prior perceptual learning; or c) added differential cues for perception</td>
<td>3. directing attention</td>
</tr>
<tr>
<td>3. acquisition</td>
<td>coding; storage entry; rehearsal</td>
<td>acquisition</td>
<td>a) suggested schemes for coding; or b) activating a set to employ an existing strategy for coding</td>
<td>4. stimulating recall 5. providing learning guidance</td>
</tr>
<tr>
<td>4. retention</td>
<td>memory storage</td>
<td>retention</td>
<td>not known, but is facilitated by earlier presentation of dissimilar rather than similar proximate stimuli</td>
<td>—</td>
</tr>
<tr>
<td>5. recall</td>
<td>retrieval</td>
<td>recall</td>
<td>a) suggested schemes for retrieval; b) cues for retrieval; c) monitoring retrieval process to ensure the use of suitable search strategies</td>
<td>6. enhancing retention</td>
</tr>
<tr>
<td>6. generalization</td>
<td>transfer</td>
<td>generalization</td>
<td>a) a variety of contexts for retrieval cueing</td>
<td>7. promoting transfer of learning</td>
</tr>
<tr>
<td>7. performance</td>
<td>responding</td>
<td>performance</td>
<td>a) instances of the performance ('examples')</td>
<td>8. eliciting performance, providing feedback</td>
</tr>
<tr>
<td>8. feedback</td>
<td>reinforcement</td>
<td>feedback</td>
<td>a) informational feedback providing verification or comparison with a standard</td>
<td></td>
</tr>
<tr>
<td>Expected Outcome</td>
<td>Possible Prerequisite Learning</td>
<td>Instructional Features</td>
<td>Critical Learning Conditions</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1.Verbal Info.</td>
<td>- referent meanings of words, i.e. concepts; - context of related information (knowledge) or meaningful information (facts); - verbal chains (names)</td>
<td>- provision of larger, meaningful context; - suggested coding schemes, including tables and diagrams</td>
<td>1. activating attention by variations in print or speech; 2. presenting a meaningful context (including imagery) for effective learning; 3. performance of restating fact or knowledge</td>
<td></td>
</tr>
<tr>
<td>2.Intel. skill</td>
<td>- component simpler skills; - information specific to the application examples</td>
<td>- prior learning and recall of prerequisite skills</td>
<td>1. stimulating the retrieval of previously learned component skills; 2. presenting verbal cues to the ordering of the combination of component skills; 3. scheduling occasions for spaced reviews; 4. using a variety of contexts to promote transfer; 5. demonstration &amp;/or verbal statement of new skill</td>
<td></td>
</tr>
<tr>
<td>3.Cog.Str.</td>
<td>- intellectual skills involved in problem solution; - information involved in problem solution; - masses of organized knowledge</td>
<td>- occasions for novel problem solving</td>
<td>1. verbal description of strategy; 2. providing a frequent variety of occasions for the use of strategies by posing novel problems to be solved &amp; not specifying the solution class; 3. demonstration of solution by student</td>
<td></td>
</tr>
<tr>
<td>4.Attitude</td>
<td>- prior success experience following choice of desired personal action; - identification with human model; - information and skills involved in the personal action</td>
<td>- experience of success following the choice of personal action; or - observation of these events in a human model</td>
<td>1. reminding learner of success experiences following choice of particular action; or, ensuring identification with an admired human model; 2. performing the chosen action, or observing its performance by a human model; 3. giving feedback for successful performance; or, observing feedback in the human model</td>
<td></td>
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<tr>
<td>5.Motor Skill</td>
<td>- executive routine controlling performance; - part-skills or motor chains</td>
<td>- learning of executive routine (verbal or otherwise); - repeated practice with informative (immediate and accurate) feedback</td>
<td>1. presenting verbal or other guidance to cue the learning of the executive routine; 2. arranging repeated practice; 3. furnishing feedback with immediacy and accuracy</td>
<td></td>
</tr>
</tbody>
</table>
and dispositions produced by learning." (1976, p. 22). Since these outcomes are of crucial importance in the designing and managing of instruction the following definitions are included.

1) Verbal information. The closest Gagné gets to a definition of what he considers verbal information to be is in a discussion of the different types, ..."The first concerns the learning of labels, or names. A second pertains to the learning of isolated or single facts, which may or may not be parts of larger meaningful communications. The third kind ... is the learning of organized information, or knowledge." (Gagné & Briggs, p. 57). He also notes that ..."Information is identified as 'verbal,' not because it is necessarily stored that way, but because verbal information is the outcome." (Gagné, 1976, p. 32).

2) Intellectual skills. "An intellectual skill makes it possible for an individual to respond to his environment through symbols." (Gagné & Briggs, p. 36). Within this category there is a hierarchy of types corresponding to the basic types of learning presented earlier (to which the parenthetical numbers refer): (2) stimulus-response connections, (3) motor chains, (4) verbal chains, (5) discriminations, (6) concrete concepts, (6) defined concepts, (7) rules, (8) higher-order rules.

3) Cognitive strategies: "This variety of capability is given a different name because, although it may be categorized as an intellectual skill, it has some highly distinctive characteristics. Most important of these is that a cognitive strategy is an internally organized skill which covers the learner's own behavior ... The term cognitive strategies applies rather generally to various skills that are used by the learner to manage the process of attending, learning, remembering, and thinking." (Gagné & Briggs, p. 47).

4) Attitudes. An attitude is defined as "...an internal state which affects an individual's choice of action toward some object, person, or event."
5) Motor skills. "Motor skills are learned capabilities that underlie performances whose outcomes are reflected in the rapidity, accuracy, force, or smoothness of bodily movement." (Gagné & Briggs, p.66).

The concept of prerequisite capabilities is fundamental to Gagné's model, as stated, "Quite apart from the logical or time-ordered sequences of instruction units inherent in the content of a course or topic, there are sometimes reasons for sequencing relating to the support of learning." (1975, p.101). The most important of these prerequisites are noted in Table 2.

To relate these learning outcomes to the processes of learning (via the instructional events and phases of instruction), Gagné recognizes the value of identifying important 'instructional features' of, and 'critical learning conditions' for each outcome (Table 2). He explains these thus, "Procedures of instructional planning to insure the identification and inclusion of multiple outcomes may be aided by two kinds of 'editing.' First, one can check to see that certain important features of instruction relevant to the proposed learning outcomes have been included (...the critical learning conditions ...). Second, by applying an 'outcome question,' one can insure that the instruction being designed is indeed likely to reach its intended objective." (1975, pp.100-101).

Thus, in planning and evaluating instruction, the desired outcomes are linked via the 'critical learning conditions' associated with each outcome to the 'instructional events' associated with each phase and process of learning.

Discussion

Of the learning theories currently available to the adult educator, Gagné's learning systems theory has much to commend it on a number of counts.
These are particularly: it is not subject-specific to any category of learning outcome; the learning outcomings provide a set of dependent variables for the planning and evaluation of instruction; and these outcomes are logically linked via instructional and learning events to fundamental processes of learning. It should be noted, however, that as a model for planning instruction, it is much stronger in the area of intellectual skill learning than it is for other outcomes. It is also strongly oriented toward manipulation of the learning environment, as noted by Dubin & Okun (p.14) ..."The chief distinction between the behavioristic position adhered to by Skinner and the neo-behavioristic positions of Hull, Hebb, Bandura and Gagné is that the latter theorists have incorporated mediational processes into their theories." It thus may be found that the model is not suitable for all adult learning situations, in many of which considerable emphasis is placed on learner self-direction of learning.
IV. PROCESSES OF ADULT EDUCATION

Introduction

If the learning outcomes identified by Gagné are to be used in evaluating the study-research group process, it is important to identify the class of educational procedures to which this process belongs. Valid comparisons can then be made with other members of that class.

Verner (1964) categorizes processes into three classes: methods, techniques and devices. Devices are said to constitute "Various mechanical instruments, audio-visual aids, physical arrangements, and materials [which] are used by adult educators to augment the processes employed..."(p.37). Clearly the study-research group process does not fall into this category.

Of the other two process categories, method is defined as being "...the relationship established by the institution with a potential body of participants for the purpose of systematically diffusing knowledge among a prescribed but not necessarily fully identified public ... [it] is institutionally centered and, therefore, an administrative function..." (Verner, 1962, p.9). "Technique, on the other hand, may be defined as the relationship established by the institutional agent (adult educator) to facilitate learning among a particular and precisely defined body of participants in a specific situation ... [it] is participant centered and, thus, a function of the learning situation."(op.cit., p.9).

It is clear from the foregoing that the study-research group process is to be regarded as a technique, rather than a method. However, before leaving a consideration of methods, it would be pertinent to consider which method the program being evaluated did conform to. In this regard Verner recognizes three subcategories of method: 'individual,' 'group' and 'community.' The program is evidently a group method, and within that category best fits the definition of a class, ..."A class consists of a sequence of
learning experiences arranged in a systematic order of predetermined duration generally structured around a limited segment of knowledge in which the agent is charged specifically with the general direction, organization, and control of the learning experience." (Verner, 1975, p.187). A further comment is made to the effect that ... "Classes are generally structured around some specific content area and the instructional emphasis is on content mastery rather than the group socialization process." (op. cit., p.188).

The Classification of Techniques

The adult education literature is replete with alternative classifications or categorizations of techniques. Gagné (1976, p.21) recognizes four major categories: lecturing, discussion, tutoring, or the use of games. He notes that instruction may be provided by using these singly or in combination.

Verner (1962) uses a classification based on the learning objective or outcome. Thus, he recognizes three major categories of techniques, those appropriate to: the acquisition of information, the acquisition of a skill, or the application of knowledge. Techniques for the acquisition of information, he observes, "...require the least active involvement in the learning process on the part of the learner..." (p.20). Techniques for acquiring a skill primarily "...are concerned/with helping the participant acquire or develop proficiency in performing a specific task. This would include communicative proficiency as well as manipulative skill. Techniques in this class involve a greater participation in the learning process on the part of the learner than the informative techniques." (p.20). "The application of knowledge is assumed to imply the utilization of skills or information and the application of principles to new situations ... to apply knowledge is to use information and skills in problem solving." (pp.20-21). While this classification does provide a functional means of classifying techniques it is not compatible with
Gagné's categorization of learning outcomes.

Verner (1962) also advances a two-dimensional classification, with the abscissa of a matrix being the 'degree of abstraction' and the ordinate being the 'degree of participation of the student in the learning experience permitted, required, or encouraged.' This classification provides a good framework for the examination of techniques in terms of the two component parameters, but is difficult to focus into a nested sequence for use on one axis in a matrix against learning outcomes.

Leypoldt (1967) classifies techniques into three categories based on very general types of outcomes, namely: 'knowing,' 'feeling' and 'doing.' These appear to correspond approximately to Gagné's outcomes of verbal information ('knowing'), attitudes ('feeling') and motor skills ('doing') but the categories are defined only by example, making their interpretation more of a puzzle than a clarifying conceptual process.

Bergevin et al (1963) classify techniques into two categories: 'techniques' and 'subtechniques.' The latter are defined thus, "The sub-technique ... resembles a technique but is less complex and functions for a shorter period of time. A subtechnique is used to adapt a technique to the requirements of a particular learning situation."(p.187). However, if general practice is any guide, all techniques can reasonably conform to this last criterion, making this classification of no real value.

Kidd (1959) deals with four categories of technique: 'lecture type activities,' 'small group discussion,' 'skill and process learning' and 'simulation.' These represent a confusion of process and outcome criteria, and thus are not of practicable value.

Knowles (1970) classifies 38 different techniques each into one or more of five different behavioral outcome categories. These outcomes, however, do not accord with Gagné's accepted learning outcomes, except in two cases — 'knowledge' and 'attitudes.' His category of 'understanding' is partly a
component of verbal information and partly intellectual skills; 'skills' should be divided into motor and intellectual; 'values' is a component of attitudes; and interests' represents an aspect of motivation to learn, not an outcome.

A number of authors (e.g. Tye, 1966) divide techniques into those suitable for small groups — with fewer than 15 to 20 persons — and those for larger groups. This provides a useful item of information for the practioner, but does not appear to cluster techniques at all well in relation to learning outcomes.

These attempts at classification reflect the underlying problem of variability in the nature of techniques. In reality, techniques represent points on a number of continuous dimensions. Each time a technique is reapplied by another person or in different situations it is likely to be shifted slightly in position on one of its dimensions. No generally acceptable and universally applicable classification is theoretically possible until adult educators: 1) identify the crucial dimensions; 2) draw (possibly arbitrary) boundaries along these to define the limits of each technique in relation to each dimension; and 3) label each category. Verner (1962) has identified this problem and made a start by working with two dimensions, as discussed above. However, this is only a start, and our collective knowledge is not yet sufficiently structured to permit the presentation here of an acceptable typology.

Accordingly, the listing of techniques for the purposes of this study uses only crude types for the purposes of reducing the diversity. The types are presented in Table 3. Authorities following type names refer to uses or explications of types. Where no authority is noted, the grouping has been done by the author on the basis of the perceived relationships between techniques. The authority following each technique refers to a selected definition or explanation of the technique. In this table combinations of
### TABLE 3—Classification of techniques using the criteria noted in Figure 1.
 Authorities following the types refer to seminal concepts of the type. Authorities following techniques refer to the definitional source for that technique.

<table>
<thead>
<tr>
<th>Type</th>
<th>Technique</th>
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</thead>
<tbody>
<tr>
<td>1. group discussion (Dietrick, 1960)</td>
<td>brainstorming or idea inventory (Bergevin et al, 1963); buzz group (Verner &amp; Booth, 1964); chain-reaction forum (Leypoldt, 1967); circle response (Leypoldt, 1967); colloquium (Verner &amp; Booth, 1964); couple buzzers (Leypoldt, 1967); group discussion (Bergevin et al, 1963); group drawing (Leypoldt, 1967); group writing (Leypoldt, 1967); round table (Verner &amp; Booth, 1964); seminar (Bergevin et al, 1963); symposium—ancient concept (Bergevin et al, 1963).</td>
</tr>
<tr>
<td>2. learner activities</td>
<td>coaching (Knowles, 1970); critique (Stott, 1966); quiet meeting (Bergevin et al, 1963); reading (Bergevin et al, 1963).</td>
</tr>
<tr>
<td>3. lecture (Verner &amp; Dickinson, 1967)</td>
<td>audience reaction team (Bergevin et al, 1963) = audience listening panel (Miller, 1964) = group response team (Leypoldt, 1967); book report (Leypoldt, 1967); clinic (Miller, 1964); colloquy (Bergevin et al, 1963); committee (Bergevin et al, 1963); debate (Dickinson, 1973); debate forum (Leypoldt, 1967); forum (Bergevin et al, 1963); interview (Bergevin et al, 1963); interview forum (Leypoldt, 1967); lecture or speech (Verner &amp; Booth, 1964); listening teams (Leypoldt, 1967); lecture forum (Leypoldt, 1967); panel (Verner &amp; Booth, 1964); problem census (Miller, 1964); question period (Bergevin et al, 1963) = recitation or question and answer technique (Dietrick, 1960); reaction panel (Leypoldt, 1967); screened speech (Leypoldt, 1967); symposium—modern concept (Bergevin et al, 1963).</td>
</tr>
<tr>
<td>4. study research group (Bagnall, 1975)</td>
<td>study-research group (Bagnall, 1975).</td>
</tr>
<tr>
<td>5. response group</td>
<td>film forum (Miller, 1964); gallery conversations (Leypoldt, 1967); learning or listening team (Verner &amp; Booth, 1964) = music forum &amp; play-reading talk-backs (Leypoldt, 1967).</td>
</tr>
<tr>
<td>6. demonstration field trip</td>
<td>field trip—demonstration (Dickinson, 1973); tours (Morgan et al, 1963).</td>
</tr>
<tr>
<td>7. demonstration</td>
<td>method or process demonstration (Verner &amp; Booth, 1964); result demonstration (Morgan et al, 1963).</td>
</tr>
<tr>
<td>8. project</td>
<td>research and report (Leypoldt, 1967); supervised research project (Verner &amp; Booth, 1964).</td>
</tr>
<tr>
<td>9. job-centered practice</td>
<td>supervised field work (Verner &amp; Booth, 1964).</td>
</tr>
<tr>
<td>10. simulation (Kidd, 1959)</td>
<td>case study (Leypoldt, 1967); exercise (Kidd, 1959); games (Stock, 1971); role playing (Staton, 1960); simulation (Verner &amp; Booth, 1964); sociodrama (Stock, 1971); T group (Kidd, 1959).</td>
</tr>
<tr>
<td>11. practice</td>
<td>drill (Verner &amp; Booth, 1964); practice (Verner &amp; Booth, 1964).</td>
</tr>
</tbody>
</table>
recognized techniques are not dealt with as such. To do so would make the
diversity unmanageable, but this is not to suggest that combinations are
invalid in any way. Subject-specific techniques, such as Leypoldt's (1967)
'depth Bible encounter' are also excluded. No claim is made for completeness
of the list beyond the material cited. The variable nature of techniques,
in any case, does not make completeness a valid criterion.

The logical relationships between the technique types are shown by
the model in Figure 1. Vertical position of a type in the model does not
relate to relative importance; the taxonomy is purely for the purpose of
visualizing relationships. Because of the dimensional variability of
techniques (discussed above), none of these types can be regarded as fixed
or limited as to its content. For the same reason it is not possible to define
strictly each criterion item in the taxonomy without destroying its function­
ality. The criteria as noted in the Figure thus are left unqualified.

The Study-Research Group Type

As defined by the criteria in the model of technique types (fig. 1)
the study-research group is a class of techniques in which the instructional
and learning activity is closely tied to the object of study; where the
instruction largely is learner-centered and primarily a group activity; and
the activity is based in the field. To distinguish the study-research group
from other potential techniques in this area, the definition must be further
qualified by stating that the technique is structured by the activities
directed toward the scientific solution of an original research problem
of some regional or greater importance.

By 'original' in the above definition is meant that the problem or a
closely similar one has not been solved before. The outcomes of the research
thereby are unknown. By 'scientific' is meant the use of procedures approp­
riate to the relevant scientific disciplines identifiable with the problem
FIGURE 1
Tentative classification of technique categories. Those marked with an asterisk are logically invalid.

Techniques

- Instruction & learning closely tied to object of study
  - Instruction largely learner-centered
    - Primarily group activity
      - Based in field
        - 4. Study-Research Group
      - Abstraction from object of learning
        - 8. Project
  - Instruction largely instructor-centered
    - Primarily individual activity
      - Based in controlled environment
        - 5. Response Group
      - Not abstraction from object of learning
        - 9. Job-Centered Practice

- Instruction & learning not closely tied to object of study
  - Instruction largely learner-centered
    - Primarily group activity
      - Based in field
        - 6. Demonstration Field Trip
      - Abstraction from object of learning
        - 10. Simulation
  - Instruction largely instructor-centered
    - Primarily individual activity
      - Based in controlled environment
        - 7. Demonstration
      - Not abstraction from object of learning
        - 11. Practice
The statement on relative importance of the problem is not logically essential as a component, but it can be argued that, in practice, the technique relies on the importance of or interest in the problem as a motivating force for learning.

In the field of adult education, the process which, on the basis of learner activity, is most similar to the study-research group, is that termed 'supervised research projects' in the model (within type 8 — project). Verner & Booth (1964) term this 'setting up and carrying out projects under supervision,' and provide the following explanation ..."To provide an opportunity for previously learned principles and knowledge to be thought through in their application to a specific project which is then carried out in an educationally controlled way so that learning may be continuous throughout the experiment."(p.81). The main distinction apparent, in this explication, between the supervised research project and the study-research group is that the former is concerned with applying previously learned skills and knowledge to a problem situation. The study-research group technique provides for the integration of prerequisite learning with its application, — indeed the motivation to undertake the prerequisite learning is derived from each task in the problem-solving process.

Rogers (1971) devotes a chapter of her book to 'projects.' With reference to this class of activities she notes, ..."The opportunities which a project offers to work with the group, but as a free agent inside it, also seem to stimulate a surprising amount of academic initiative."(pp.162-3). This statement identifies what is evidently a major feature of project work in Great Britain, namely that it is essentially a loose coordination of individual, or essentially individual, research activities.

Another important feature of much of that which is paraded under the 'project' process is that it is, in reality, a method of approach which is using either the project or the study-research group technique. For example,
Rogers (pp.159-160), in discussing a 'classic example' of the project, states, "In Nottingham a group of twenty students under the leadership of two tutors from the university ... made a study of the St. Ann's district of the town ... The group, which began as a normal course in sociology, turned itself over the three years into a highly efficient research team as well as continuing, as an adult-education group, to learn a good deal at a highly conceptual level about social class in general, poverty in general and sociology in general."

These contrasts aside, it should be noted that study-research groups do fit within Rogers' broad definition of 'project,' ... "Project work usually involves the group leaving the cocoon of the classroom and venturing out to seek raw materials from local people, records or conditions. Even where the materials have not been local, but have involved the group in an intensive study of some foreign or national event, the result of the project, its end product, has often been in a form which involved offering something to the community — a book, an exhibition, a series of study walks, a play." (p.159). This is, however, too broad a definition for meaningful identification.

From the material presented it is evident, nevertheless, that at least some of what Rogers is discussing falls within the study-research group type. None of the examples includes substantial research in the natural sciences and, as she notes, ... "The majority of projects so far produced by groups both in Britain and in the United States have been of a sociological, archaeological or historical kind..." (p.170). Arasteh's (1966) work, mostly with university undergraduate groups, is definitely of the study-research group type, and is in the sociological field. Smith (1965) in discussing adult education history teaching processes in Britain, acknowledges, somewhat reluctantly, the role of research-based instruction, ... "The aim of
the local history course is therefore seen by some as a need, from the start, to engage the student in the actual work of research." (p. 39).

There are available the products of much of this activity, and perusal of these supports the conclusion that much of it is indeed 'project' work as defined here. For example, the report by Smith et al. (1963) which covers the accumulated results of a one-week residential school during which participants undertook small biological projects on various topics of personal interest. Such work, commonly undertaken through the British Field Studies Centres, does not meet the criteria of research importance or group activity for inclusion in the study-research group process.

Hutchinson (1965) in an extensive examination of adult education processes in the teaching of sciences could find only limited evidence of research-based (project or study-research group) techniques. The application of these techniques was limited as to subject area — to botany and ornithology — and also limited to the drafting of species lists and distribution maps. He also sees this activity in the same role as that noted by Rogers, namely as following prerequisite learning undertaken with different instructional techniques.

The stated or suggested values of the technique may be summarized as follows:

1) the learning process:
   - facilitates the welding of a class or group into a working team (Bagnall, 1975);
   - makes good use of the existing skills of class members (Bagnall, 1975; Rogers, 1971);
   - allows participants to find their own level of participation and appreciation at each stage of the work (Bagnall, 1975; Rogers, 1971);
   - encourages learning by making the material meaningful, by providing for practice and reinforcement, and by providing for self-assessment as
results are worked-up, discussed and checked (Bagnall, 1975);
— maintains participant interest in studying the subject (Bagnall, 1975);
2) the learning outcomes:
— provides a means of teaching science as it is, namely an integration of existing information and research (Bagnall, 1975; Rogers, 1971; Arasteh, 1966);
— develops in participants a more informed and critical attitude towards science (Bagnall, 1975; Rogers, 1971; Arasteh, 1966);
— provides a means of involving students in original and important applied research (Bagnall, 1975; Arasteh, 1966);
— encourages inter-disciplinary study (Rogers, 1971).

The Generalizability of Process in Adult Education

Verner (1968) develops a thesis concerning the relative diffusibility of methods and techniques in adult education. He suggests that "...method is culture-bound and cannot be transmitted successfully to another culture so that only the idea which underlies the method can be transmitted through stimulus diffusion."(p.91). Stimulus diffusion refers to the trans-cultural transmission of ideas from which each culture develops its own methods to encompass the idea.

Verner derives a number of propositions from this thesis. Those of particular pertinence here are (p.92): 1)..."Different societies develop unique methods to meet their need for continuous learning; consequently, a system of adult education established in one is not necessarily appropriate for another." and 2)..."The method developed to meet a specific need for learning in one culture is not necessarily suited to the same need in a different culture." While these propositions were advanced as only "...functional hypotheses for further research in adult education,"(p.92) they appear to be unrefuted and may warrant a higher status.
With regard to techniques, Verner (p.93) notes that "These propositions do not apply to techniques of instruction since these are based on different principles which are influenced by culture only indirectly ... While the methods of adult education are culture patterns derived from a given culture configuration, the techniques of instruction are derived from the psychological principles of human learning which are independent of culture."

He also notes (Verner, 1962, p.9) that "Techniques are, for the most part, independent of methods ... in general, most techniques are applicable under more than one method."

Since the study-research group process is reasonably classified as a technique these concepts have strong implications for the trans-cultural diffusion of the process and its use under different methods. The literature does, however, contain some cautionary notes. Smith (1965, p.42) comments, "The experience of many worthwhile adult classes surely is that little is done in the way of research by students, and there can be no case for offering courses only to those able and willing to undertake such work. Adult education is by definition directed to working adults who are without the opportunity or leisure for becoming professional students or full-time practitioners of an intellectual hobby." While Rogers (1971, p.172) observes that "...projects are not panaceas ... Projects are not miraculous teaching techniques to be produced out of a hat, but means to serve educational and possibly social ends, and to be employed therefore with proper caution and respect."

The Relationship Between Techniques and Learning Outcomes

The desirability of planning instruction and choosing techniques in relation to the intended learning outcomes was early promoted by Mueller (1937) who stated (referring to techniques as 'methods'), "If information
and knowledge are the outcomes desired at another time, appropriate methods of acquiring this information and knowledge must be used ... Again, if appreciations are what we are after, our methods will be those whereby appreciations may be developed most readily." (Mueller, 1937, p. 47).

Mueller's categories of learning outcome necessarily reflect the knowledge available at the time of writing. Since then a number of adult educators have considered techniques in relation to learning outcomes. Unfortunately, compatibility of published outcome categories with Gagné's recent taxonomy is not easily and definitively established. For example, the most commonly used scheme has been that which recognizes three outcomes (Verner, 1962): the acquisition of knowledge, the acquisition of a skill, and the application of knowledge. Judging from the definitions of these categories, already noted earlier in this section, it appears that:

1) techniques for acquiring knowledge would primarily relate to Gagné's class of verbal information; 2) techniques for applying knowledge would primarily apply to intellectual skills, but also to cognitive strategies, especially those related to problem solving; and 3) techniques for acquiring a skill would primarily relate to motor skills but also strongly to intellectual skills.

Accepting, tentatively, such uncertain relationships as those just developed it is possible to summarize the pertinent literature in the form of a matrix of learning outcomes and technique types (Table 4). The technique types are those developed in Figure 1 and Table 3. Consequently, the matrix must suffer from the additional inadequacies of the basic classification. Nevertheless, the clustering of references into certain cells on the matrix should be expressive of some meaningful relationships. Because of the shortcomings of the technique classification, it must be appreciated that not all techniques in one class are equally suitable for instruction toward any
TABLE 4—Suitability of technique types in relation to learning outcomes, as identified by selected authors. Upper-case letter indicates suitability as identified by that authority; lower-case indicates unsuitability. Parentheses indicate that the technique is of lesser utility as identified by the authority.

Authorities: A = Bergevin et al (1963); B = Champion (1975); C = Dickinson (1973); D = Hill (1960); E = Kidd (1959); F = Knowles (1970); G = Leypoldt (1967); H = Miller (1964); I = Morgan (1963); J = Staton (1960); K = Stock (1971); L = Stott (1966); M = Tye (1966); N = Verner & Booth (1964); O = Verner & Dickinson (1967).

<table>
<thead>
<tr>
<th>Technique</th>
<th>Verbal Information</th>
<th>Intellectual Skill</th>
<th>Cognitive Strategy</th>
<th>Attitude</th>
<th>Motor Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. learner activities</td>
<td>(A), (M), L</td>
<td>(A), L</td>
<td></td>
<td>(A)</td>
<td>F</td>
</tr>
<tr>
<td>3. lecture</td>
<td>A, C, D, E, F, G, I, J, L, N, O</td>
<td>c, (M), o</td>
<td>c, o</td>
<td>c, (D), e, (F), (L), o</td>
<td>c, o</td>
</tr>
<tr>
<td>4. study-res. group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. response group</td>
<td>F, M, N</td>
<td>F, N</td>
<td></td>
<td>(F), N</td>
<td></td>
</tr>
<tr>
<td>6. demonstration field trip</td>
<td>C, I, M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. demonstration</td>
<td>L</td>
<td>A, C, I, (J), M, N</td>
<td></td>
<td>(A)</td>
<td>A, C, E, I, J, L, M, N</td>
</tr>
<tr>
<td>8. project</td>
<td>A, G</td>
<td>A, M, N</td>
<td>M, N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>9. job-centered practice</td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>11. practice</td>
<td>C, (J), (L), N</td>
<td>C, E, F, J, L, N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
particular learning outcome. Neither can one class of techniques necessarily
stand on in its own, as, for example in the essential linking of
demonstration and practice in skill learning. It is not yet possible to weight
each cell in the matrix, but in some cases, a class of techniques was noted
as being markedly less effective for a particular outcome, in which case
this has been included. Also noted are explicitly stated cases of unsuitab-
ility.

An alternative, semi-theoretical, procedure is to relate the critical
learning conditions identified by Gagné for each learning outcome (Table 2)
with the instructional events associated with each phase of instruction
(Table 1). One can then apply the knowledge of each technique type to each
intercept in the table. By selecting only those technique types with component
techniques having characteristics which would facilitate the activity identi-
fied by the intercept, one arrives at the results in Table 5. The conclusions
there presented can be regarded only as very tentative, and as such should
be used as a guide to research rather than instruction. It must also be
restated that in some cases not all of the techniques in a class are equally
suitable for the task associated with each positively marked cell in the
matrix. If the matrix does nothing else, it at least suggests that many
techniques are quite unsuited to some learning outcomes, and that some
techniques are suitable for use only in conjunction with others. The high
scoring given to the study-research group is largely theoretical and open to
substantiation or refutation by the present and future studies.

Analysis of Research-Based Education in Terms of Learning Outcomes

Before embarking on an evaluation of a technique which is linked
with the instruction of research-based content, it is important to form some
concept of the key learning outcomes in such a task.

The crucial requirements in relation to a problem-solving task are
TABLE 5 — Theoretical suitability of techniques for achieving the critical learning conditions (Table 2) associated with each learning outcome. Cross-hatching = technique suitable; asterisk = technique not suitable. Techniques excluded from a learning outcome category are considered to be unsuitable for all of the critical learning conditions identified.

<table>
<thead>
<tr>
<th>Technique Type</th>
<th>Instructional Events</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1) activating motivation</td>
</tr>
<tr>
<td>1. group discussion</td>
<td>*</td>
</tr>
<tr>
<td>2. learner activities</td>
<td></td>
</tr>
<tr>
<td>3. lecture</td>
<td>*</td>
</tr>
<tr>
<td>4. study-research group</td>
<td></td>
</tr>
</tbody>
</table>
| 5. response group | * | | | | | | | *
| 6. demonstration field trip | | | | | | | | *
| 8. project | * | | | | | | | *

Learning Outcome

cog. strat., int. skill

motor skill attitude

1. group discussion
2. learner activities
3. lecture
4. study-research group
5. response group
6. demonstration
7. project
8. practice
9. job-centered practice
10. practice
shown in Figure 2. Verbal information is identified as a necessary prerequisite to the solution of a novel problem, in that there is little point in beginning the solution of a task at anything less than the current level of understanding. This is not, however, to imply that large bodies of information need be learned before a problem is tackled. Rather, that having defined the problem, the researcher should then apprise himself of the pertinent existing knowledge before embarking on the research program. In this way existing knowledge, the products of earlier research efforts, are put into the perspective of ongoing means to the solution of further problems, rather than as vast bodies of 'scientific' facts unrelated to current needs.

FIGURE 2
Learning outcomes in relation to research-based education.

fundamental frontier science research skills

prerequisite prerequisite

fundamental frontier research skills

prerequisite knowledge

basic science research skills

basic research skills

ATTITUDES VERBAL INFORMATION MOTOR SKILLS INTELLECTUAL SKILLS COGNITIVE STRATEGIES

 Appropriately critical attitudes are also regarded as prerequisites. The failure to take this component into account is a major failing of the project technique as applied to novice researchers. However, in a group-research project the attitudes of the more experienced members and of the leader are continually used as input and as reinforcing models in the process of the research. The aim, then, in the latter case is to bring the attitudes
of each group member up to an appropriate level of scepticism and criticality in the course of the project.

Intellectual skills are identified as basic research skills in that they apply to all research subjects. Problem-solving skills are of particular importance and since, in terms of Gagné's hierarchy of learning types they require all other appropriate skills as prerequisites, they must be seen as objectives to be attained in the course of a whole project. Here, again, the group approach has the advantage of permitting participants to be involved meaningfully in a problem-solving situation while developing the appropriate skills and learning them from fellow participants. By contrast, a participant in an individual project situation requires the appropriate skills before he can make meaningful progress.

In addition to requiring intellectual skills, all practical science subjects draw on certain motor skills. These tend to be highly specific to particular research techniques, and are thus most suitably learned as the need arises. In Figure 2 these are identified as distinctive features of the category, 'basic science research skills.'

With the foregoing capabilities an individual is reasonably well equipped to tackle problems and to criticize research studies when these fall into identifiable categories. However, if the learner is to engage in problem solving by developing novel approaches, it is important that he possess the appropriate cognitive strategies with which to tackle the problems. In Figure 2 this identifies two more categories: 'fundamental frontier research skills' (cognitive strategies and intellectual skills), which apply to all truely creative research situations; and 'fundamental frontier science research skills' (cognitive strategies, intellectual skills and motor skills), which apply to truely creative practical science research situations.

If we narrow our focus on learning goals to that of developing
the learner into one who is constructively able to criticize and analyze the results of research which directly affect him (e.g. environmental research, nutrition research) we can slightly modify our desired outcomes. In this case the most important outcomes for all subjects are: attitudinal, intellectual skills and cognitive strategies. Given these, the prerequisites verbal information can be obtained, and motor skills are superfluous. Jeske (1973, p.284) leans toward this scheme in viewing the need for environmental education as requiring the following—"...instruction that will help adults: sort fact from fancy and the significant from the trivial in environmental matters by acquiring appropriate knowledge and developing skills of analysis and synthesis ... [and will] develop skills necessary for evaluating facts and recognizing value judgements in alternative proposals for resolving environmental matters."

Accepting this last learning goal as the most appropriate one, at least for liberal adult education in science subjects, two important observations emerge from the above analysis.

Firstly, verbal information and motor skills should be seen as means to an end, not as ends in themselves. With particular reference to environmental education, Hackel (1962, p.175) states it thus, ..."We may say, then that science is a creative human activity, dependent on and responsive to societal structure, going beyond the encyclopedic phase of mere classification and organization of knowledge, and going beyond technology ..." This runs counter to practically all adult education practice in the area of concern, where traditional techniques such as lecturing, reading, and carrying out small scale laboratory or field experiments place overwhelming emphasis on the acquisition of information and motor skills.

Secondly, that if the important learning outcomes — attitudinal change, intellectual skill and cognitive strategy development — are to be
attained, the technique or techniques used must provide for appropriate learning in all types of outcome categories. However, the outcomes being strived for at any particular time cannot be predetermined since they relate to other outcomes associated with other tasks which are in turn linked to the unpredictable path of the problem-solving process. Each learner is likely to be aiming at a different learning outcome at any particular time. In short, either the instructor structures a life-time of prerequisite learning for his adult students, or he structures the learning around an original research problem. Only the latter technique can theoretically attain the learning goals in reasonable time for part-time adult students. Regrettably, most science adult educators opt for the former approach, and thereby develop, if at all successful, competent amateur technicians and adults with funds of largely useless and historical, scientifically obtained, information.
V. PRINCIPLES OF ADULT EDUCATION IN THE DESIGN AND MANAGEMENT OF INSTRUCTION

Introduction

This section comprises the results of an attempt to extract, from the adult education literature, a set of commonly accepted principles representing the good design and management of instructional situations for adult learners. These principles may then be used as a set of target variables in the evaluation of the study-research group technique.

The criteria for inclusion of a publication were that if contained at least three explicit principles under whatever heading these were presented, and that it was addressed specifically to adult education.

Much published material, not included in this review, is addressed either to matters of adult education philosophy, in which case the concepts are too general to be included as practicable principles, or to procedures too situationally specific to be considered as principles for the field as a whole.

The term 'principle' is used to refer to a directly applicable procedural concept relevant to the field as a whole. Fundamental concepts, such as those obtained from psychological studies of adults, are not included since they cannot be applied directly as functional guidelines. Toward the opposite end of the conceptual spectrum, items are excluded because they relate only to situationally dependent components of adult education, e.g. instruction directed toward the achievement of particular learning outcomes.

Although the purpose of this search was to identify principles pertaining to the design and management of instruction, many of these principles are generalizable to the program planning process. The greater part of the published work in this area of instruction is derived either from psychological studies of adults or more specifically from research into
adult learning. Principles directed specifically to the program planning process are rare and insecurely based due to the lack of criteria by which program planning at the organizational level may be evaluated in terms of adult learning. As Houle (1972, p.250) notes, "...the program-planning theories in the general field of the curriculum have only limited usefulness for adult education since they are largely based on the specific practices of schools and colleges."

Commonly Identified Principles of Adult Education

A summary of the principles, and of the authors who identify the principles, is presented in Table 6. No principle was included in this table if it was identified by fewer than 4 (25%) of the authors listed.

The following is a discussion of each principle to reveal its meaning and extent. In each case, more than one authority is used only as far as is necessary to define the principle using the above two criteria.

A. Principles Pertaining to the Individualization of Learning

1. Ensure high motivation to learning

This is one of Miller's six conditions of learning, and is stated as "The student must be adequately motivated to change behavior." (p.38). Also, as Brunner et al note, "learning is most rapid when motivation is strong..."(p.23). But Verner and Booth observe that "With motivation providing the stimulus to participation in an educational activity, further and different motivation is required in order that such participation result in effective learning..."(p.24). The same point is made by Miller, "Motives which are strong enough to bring an individual into the learning situation may be too weak by far to keep him in it for very long or to keep him at work; the very high drop-out rate in adult programs which are not vocationally based is in part a measure of that motivation strength. By
TABLE 6 — Matrix of adult education principles and authorities. Asterisk indicates identification of a principle (row) by an author (column). Parentheses indicate that the author assumed or implied the principle.

<table>
<thead>
<tr>
<th>Principles</th>
<th>Authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ensure high motivation to learning</td>
<td>*</td>
</tr>
<tr>
<td>2. maintain adult autonomy</td>
<td>*</td>
</tr>
<tr>
<td>3. allow for individual pace and level of learning</td>
<td>* (<em>)&amp;(</em>)&amp;</td>
</tr>
<tr>
<td>4. make allowance for psychological and physiological ages</td>
<td>(<em>) (</em>)</td>
</tr>
<tr>
<td>5. provide for practice with reinforcement of correct behavior</td>
<td>*</td>
</tr>
<tr>
<td>6. utilize group influences on learning</td>
<td>* * * * * * *</td>
</tr>
<tr>
<td>7. provide a secure learning environment</td>
<td>*</td>
</tr>
<tr>
<td>8. ensure relevance of the material to the learner</td>
<td>*</td>
</tr>
<tr>
<td>9. ensure meaningfulness of the material to the learner</td>
<td>* * (<em>)&amp;</em></td>
</tr>
<tr>
<td>10. enable individuals to utilize previous learning</td>
<td>*</td>
</tr>
<tr>
<td>11. ensure active involvement in learning</td>
<td>* * * * * *</td>
</tr>
<tr>
<td>12. provide for learner involvement in needs diagnosis</td>
<td>* (*)&amp;</td>
</tr>
<tr>
<td>13. provide for learner involvement in course planning &amp; management</td>
<td>* (*)&amp;</td>
</tr>
<tr>
<td>14. ensure learner knowledge of expected behavior</td>
<td>*</td>
</tr>
<tr>
<td>15. facilitate learner awareness of behavioral inadequacy</td>
<td>*</td>
</tr>
<tr>
<td>16. facilitate learner self-evaluation</td>
<td>(*)</td>
</tr>
</tbody>
</table>

far the weakest seems to be pure curiosity, a lusting after knowledge for knowledge's sake..."(p.39). Gibb (1960) makes the point that "...to be maximally effective the motivation must be intrinsic."(p.59).

Also included in this principle is the concept of optimal tension. As stated by Jensen, "...the psychological tension level of adult learners must be maintained at a level which permits the release of energy into problem-solving and work interactions at a rate required by the learning projects and objectives set for the instructional group and its individual members."(p.148).

2. Maintain adult autonomy

As stated by Pine & Horne, "...Learning is facilitated in an atmosphere in which people feel they are respected ... [and] accepted."(p.133). Also, Jensen states, "...the authority and decision-making interactions between adult learners and instructors must be such that adults participating in an instructional group do not experience a loss of adult autonomy."(p.150). For Lindeman this principle was one of the core elements in his philosophy.

3. Allow for individual pace and level of learning

This is an explicit recognition of the individuality of adult learning. As stated by Dickinson, "...When he is designing learning activities for adults, the instructor should recognize that each person will learn at a different rate and that the type of material will influence learning."(pp.10-11). The principle is also a component of Jensen's statement on diversity of goals, "...the development of multiple group goals for adult instruction must be permitted to the point that the group is still able to function effectively as a group and that the fulfillment of individual learning needs is promised."(p.149). He develops this further, "...adult learners must be given opportunity (without loss of personal esteem and
social responsibility) to determine realistically their present level of behavioral integrations with respect to proposed instructional objectives." (p.151). Pine & Horne (p.126) state that ..."Learning is facilitated in an atmosphere which emphasizes the uniquely personal and subjective nature of learning... [and] in which difference is good and desirable."

4. Make allowance for psychological and physiological ages

This principle overlaps strongly with number 3, but as these two principles are regarded separately by different authors, and agreement with '4' does not logically imply agreement with '3', they are treated separately here.

As stated by Tye (p.155), this principle is that ..."Learning experiences ... should be organized according to the best available understanding of the characteristics of adulthood which are relevant to education." From the works of Verner & Booth, Dickinson, and Brunner et al it is evident that this understanding must include both psychological and physiological factors.

5. Provide for practice with reinforcement of correct behavior

This principle is frequently discussed as two separate principles (1. practice, and 2. reinforcement for correct behavior). However, in all references to these, they are both considered and closely linked. They are, accordingly, placed in the one category in this paper.

As summarized by Miller, the principle is stated in two concepts, ..."The student must have opportunities to practice the appropriate behavior." (p.48) and ..."The student must get reinforcement of the correct behavior." (p.49). Jensen states it thus,"...the gratifications or rewards adults experience from participating in the instructional group must result primarily from problem-solving and work interactions leading to the
acquisition of new behaviors..."(p.149).

Dickinson (p.11) observes that ..."Mere repetition without purpose or guidance is of little value as it does not result in increased learning." He also provides a very general definition of reinforcement, ..."Reinforcement is anything in the learning situation that increases the probability that the desired behavior will be repeated."(p.12). Oddly, he treats 'Knowledge of Results' as a principle separate from 'Reinforcement,' although it is clear from his discussion that he understands the former as being a component of reinforcement. Thus, in discussing 'Knowledge of Results' he notes, ..."Learning is aided if the adult finds out immediately after practice whether or not his response was correct. This feedback or knowledge of results acts as reinforcement..."(p.13).

B. Principles Pertaining to the Value or Group Activities in Learning

6. Utilize group influences on learning

A principle referring to the values to be derived from proper management of the interpersonal environment of groups, ranging in size from a diad of one learner with an instructor, upwards.

The range of concepts which this principle encompasses is best demonstrated by the following selection of quotations. "For maximum learning the learner must interact with other learners in such a way as to expose his attitudes and gaps in knowledge and skills to himself and to others."(Gibb, 1960, p.60). "Learning is facilitated in an atmosphere which permits confrontation." (Pine & Horne, p.133). "...the psychological climate should be one ... in which there exists a spirit of mutuality between teachers and students as joint inquirers..."(Knowles, 1970, p.41). "Learning experiences should be organized so as to reduce the resistance to change inherent in learning by ... attempting to mobilize the learning group to reduce individual resistance."(Tye, pp.151-152). "In terms of structural processes, a greater
amount of formal and informal interaction should be conscientiously structured to narrow instructor-learner social distance..." ([Lan & Wong, p.140]).

A number of authors sound a cautionary note in their discussion of group values, e.g. "There is no question at all of the power of the group to reduce individual resistances to change if properly mobilized; but pious insistence on rituals of informality and first-name calling will not necessarily ensure its mobilization on the side of effective learning." (Miller, p.41). While Brunner et al (p.195), after discussing conflicting studies in the literature, suggest, ..."A possible hypothesis in this area would be that under the stimulation of an environmental situation certain types of people learn more efficiently in group situations than working alone."

7. Provide a secure learning environment

This principle is divided by Gibb (1958) into two: 'The Supportive Atmosphere Norm' (i.e. the need for a secure learning environment in which the adult learner can make mistakes), and 'The Provisional Behavior Norm' (i.e. the feeling of freedom on the part of the learner to make mistakes). Miller notes (p.42), ..."The major resistance to change ... is the defensive-ness aroused on behalf of already established behaviors, and the fundamental requirement for success is the provision of sufficient security for the student to permit him to relax his defensive posture."

C. Principles Pertaining to the Content Material

8. Ensure relevance of the material to the learner

The principle is of fundamental importance to a great many adult educators. Lindeman, writing in the first quarter of this century, was one of the first adult education writers to address himself at length to its
development. He argued that education should be equated with life and that adult education should go beyond vocational and materialistic goals to encompass all of life's ideals.

As observed by Verner & Booth (p.22),..."The motives that lead to participation in adult education or to learning stem from the needs that arise out of experience." The concept ranges in intensity from the statement made by Lam & Wong (p.140),..."Specifically, course content must be brought within the interests of adult learners in order to develop satisfaction among learners." to that of Gibb (1960, pp.58-59),..."Learning must be problem centered. For the most significant kinds of learning that adults do, the problem must be a problem for the learner, not a problem of the teacher."

McClusky observes that these problems may be equally those of the individual as of the community or society,..."It would, however, be poor teaching as well as poor educational statesmanship if in our response to the learner's problems we ignored the larger problem of society; in an ultimate sense these could be even more important to the adult than those close at hand of which he is most sharply aware."(McClusky, p.169).

Knowles sees this principle as one arm of a dichotomy between a subject-orientated and a person-orientated approach,..."To adults, education is a process of improving their ability to deal with life problems they face now. They tend, therefore, to enter an educational activity in a problem-centered frame of mind ... Andragogy calls for program builders and teachers who are person-centered, who don't teach subject matter but rather help persons learn."(Knowles, 1970, p.48). Champion (p.300), however, sounds a word of warning,..."The emphasis on student-centered rather than subject-centered activities, which has done so much recently to improve the ways in which tutors teach, has now, however, begun to go too far."
9. Ensure meaningfulness of the material to the learner

The intent of this principle is encompassed in the following statement by Dickinson (p.11)..."Material that the learner believes to be meaningful is learned more readily and is remembered longer than material which is seen as non-meaningful. Meaningfulness can be established in two general ways: by presenting material that is similar to something that is already known, and by organizing new material in a pattern that the learner can perceive."

Miller (p.50) concentrates on the appropriate sequencing of materials and notes,..."The fault lies, often enough, not only in the assignment of impossible amounts of difficult reading material but in the failure to make clear to the student what the purpose of the reading is, what its relationship is to the learning goals which he can comprehend and find personally meaningful." McClusky, in looking at meaningfulness in relation to content takes, in addition to the element identified by Miller, the point that ..."To be meaningful, learning must give the adult as much insight into relationships as possible ... Operationally, this implies that in learning an adult must achieve as large a perspective of his problem as possible, and be able to place ad hoc issues which cry for attention in the context of this perspective."(Miller, p.170).

Knowles relates meaningfulness to teachable moments arising from developmental tasks, after the concept developed by Havighurst (ref. Havighurst & Orr, 1956),..."If the teachable moment for a particular adult to acquire a given learning is to be captured, it is obvious that the sequence of the curriculum must be timed so as to be in step with his developmental tasks. This is the appropriate organizing principle for an adult-education program, rather than the logic of the subject matter or the needs of the sponsoring institution."(Knowles, 1970, p.47).
10. Enable individuals to utilize previous learning

Zahn (p.75) identifies this principle when he notes, "The more the teacher of adults can base his teaching upon previous experience, the better and faster the adult will learn." Lindeman considers the adult student's experience to be his greatest learning resource. Knowles makes the point very firmly, "...to an adult, his experience is him. He defines who he is, establishes his self-identity, in terms of his accumulation of a unique set of experiences ... Because an adult defines himself largely by his experience, he has a deep investment in its value. And so when he finds himself in a situation in which his experience is not being used, or its worth is minimised, it is not just his experience that is being rejected — he feels rejected as a person." (Knowles, 1970, p.44).

Jensen (p.150) takes a pragmatic stance on this principle with the statement that "...adults must be free to assess and react to the expert knowledge of the instructor in light of the realities of their own life experiences."

McClusky (p.172) represents the most cautious approach in suggesting, "Perhaps the adult needs to have more confidence in the value of his experience, perhaps it is the task of the educator to help the adult reorganize his experience so he can learn how to extrapolate the particular until it takes on the aspects of the universal."

D. Principles Pertaining to the Centering of Education on the Learner

This group of principles is encapsulated in a statement by Powell & Benne (p.51), "...under all the group and community emphases there is a strong and vital agreement on the individual as the learner, the agent of learning and of judgement and acting, the goal and test of all the learning-situations that educators can devise."
11. Ensure active involvement in learning

Jensen (p.142) recognizes this principle as a societal 'value norm' which, he suggests, is derived from the 'Protestant Ethic.' It is the "...value that learners should be kept psychologically involved in the instructional situation, both emotionally and cognitively, to the highest possible degree. A 'good instructional situation' is one in which the learners are always highly interested and extending maximum effort to learn." As Gibb (1960, p.60) notes, "Several experiments indicate that the active learner is a more effective learning organism than the passive learner."

Miller (p.40) observes that lack of involvement can negatively affect student motivation, through the learner being unable to see the learning task as personally important and significant. He further states that "Whatever the problems ... the basic issue remains clear and emphatic: If we are interested in having the student learn, he must be active in some appropriate fashion; he must have the opportunity to do what he is supposed to learn to do."(p.49). This last statement reveals the closeness of this principle to number 5 (provide for practice with reinforcement of correct behavior), indeed principle number 11 is a prerequisite of 5.

12. Provide for learner involvement in needs diagnosis

Knowles is the strongest proponent of this principle, stating that "...great emphasis [in andragogy] is placed on the involvement of adult learners in a process of self-diagnosis of needs for learning."(Knowles, 1970, p.42). In his 1974 paper (p.315) he, interestingly, defines this process as "Mutual self-diagnosis."

Pine & Horne (p.126) are rather more moderate in their view of the principle, "...a situation in which people are freely able to express their needs rather than having their needs directed to them." Indeed the general concept of this principle is to ensure at least some involvement by
participants or potential participants in needs diagnosis.

13. Provide for learner involvement in course planning and management

This principle is clearly stated by Dutton (p.182), "...if adult educators are to be successful in their attempts to serve the public, they must involve the people in planning these programs." Knowles (1970, p.42) sees this principle being applied as "...the involvement of the learners in the process of planning their own learning, with the teacher serving as a procedural guide and content resource." Or, as stated by Boyle (p.23), "The planning group should include local citizens who are potential participants in the program ... Democratic principles should be used wherever possible in planning the program."

14. Ensure learner knowledge of expected behavior

Verner & Booth (p.24) note, "A knowledge of the task to be undertaken increases the efficiency with which it is accomplished." Miller (p.45) accepts as one of his six principles that "The student must have a clear picture of the behavior which he is required to adopt." Whereas Knowles tends to regard this principle as a prerequisite or component of the following one.

15. Facilitate learner awareness of behavioral inadequacy

Miller (p.42) states that "The student must be aware of the inadequacy of his present behavior." Knowles (1970, p.42) considers the application of this principle to be parts two and three of the three-element needs diagnosis. He develops the three parts thus: 1) 'Constructing a model of the competencies or characteristics required to achieve a given ideal model of performance ... 2) Providing diagnostic experiences in which the learner can assess his present level of competencies in the light of those
portrayed in the model ... 3) Helping the learner to measure the gaps between his present competencies and those required by the model, so that he experiences a feeling of dissatisfaction about the distance between where he is and where he would like to be and is able to identify specific directions of desirable growth."

16. Facilitate learner self-evaluation

This principle is stated by Pine & Horne (p.126) as ..."Learning is facilitated in an atmosphere in which evaluation is a cooperative process with emphasis on self-evaluation." Knowles (1970, p.43) pushes the emphasis more toward self-evaluation, "...andragogical theory prescribes a process of self-evaluation, in which the teacher devotes his energy to helping the adults get evidence for themselves about the progress they are making toward their educational goals." He regards the process as being a "...Mutual re-diagnosis of needs."(1974, p.315) Dutton (p.181) represents the other polar end of this principle, and notes,..."The learner must have feedback about progress toward goals." Jensen (p.150) is in an intermediate position in calling for learner-identification with the evaluation methods, "...the problem-solving and work interactions between adult learners must provide for the use of effective public methods for evaluating learning progress of individual adults."

Additional Guidelines for Adult Instruction

A number of adult education principles which have appeared in the literature are not included in the foregoing discussion. In many cases they will be recognized as components of the principles here recognized. In other cases they have been too situationally specific or non-functional to conform to the criteria of inclusion. Finally, there are those which were addressed by only a few (less than 25%) on the authors included in the matrix. Since
the guidelines in the last category may become accepted in time, they are listed here for reference.

1. Only material which is essential to the attainment of each learning objective should be included. (Tye, 1966)
2. Where there exists a gap, learners should be helped to raise their levels of aspiration to match their abilities. (Tye, 1966)
3. A wide range of alternative techniques and devices for attaining objectives should be considered, and only those chosen which are most appropriate for each objective. (Boyle, 1958; Lam & Wong, 1974; Tye, 1966)

Discussion

The principles of adult education derived from the literature are most completely encapsulated by Knowle's 'Andragogical Theory of Adult Learning' (Knowles, 1973). This is not to suggest that the theory gave rise to the principles, or that, because it encompasses most of the principles, it is necessarily the best theory to follow in designing and managing adult education activities. Indeed, the 'theory' does not provide an adequate conceptual framework from which to plan and manage the details of adult education. It is rather an agglomeration of good management principles which can guide the general behavior of educators in their task. The details of planning and management must rest on a more structured learning theory such as that of Gagné (Gagné & Briggs, 1974; Gagné, 1975).

In spite of its limitations, Knowle's theory is worth examining, at least because it is an attempt to interrelate a number of adult education principles. The theory derives, essentially, from these principles and thus has a rather poorly integrated foundation. Knowles recognizes this weakness and attempts to shift the derivation of the theory to a lesser number of variables, thus, "Andragogical Theory is based on at least four main
assumptions that are different from those of pedagogy." (Knowles, 1973, p.45). These assumptions are:

1) "...that as a person grows and matures his self-concept moves from one of total dependency to one of increasing self-directedness." (p.45)

2) "...that as an individual matures he accumulates an expanding reservoir of experience that causes him to become an increasingly rich resource for learning, and at the same time provides him with a broadening base to which to relate new learnings." (p.45)

3) "...that as an individual matures, his readiness to learn is decreasingly the product of his biological development and academic pressure and is increasingly the product of his developmental tasks required for the performance of his evolving social roles." (p.46)

4) "...that children have been conditioned to have a subject-centered orientation to most learning, whereas adults tend to have a problem-centered orientation to learning." (p.47).

From the literature of adult education it is thus possible to identify a number of core principles of adult education which are generally applicable to the design and management of instruction. These can thereby form one set of target variables on which to evaluate an adult education program.
VI. PARTICIPANT BACKGROUND AND PARTICIPATION

The Adult Education Participant

Johnstone & Rivera (1965), on the basis of their survey of adult education participants in the United States, stated that ..."The first distinctive feature of the participant is that he is younger than the average American adult." (p.6). But they observed that participants were about equally divided between men and women. Also, ..."The second outstanding feature of the participant is that he is better educated than the average adult ... Participants were also more likely to hold white-collar than blue-collar jobs and, in addition, had median family incomes almost $1,200 higher than the average. Of these three indicators of socio-economic position, however (education, occupation and income), formal schooling was found to have by far the most powerful influence on rates of learning activity." (p.7).

Boshier (1973) considers non-participation to be related causally to the same factors as is dropout from a program. This thesis is developed into a life-space, life-chance model outlined in the following section. A fundamental concept of the model is the positive relationship between non-participation (and dropout) and incongruence produced between the potential participant (or the dropout) and some components of the instructional setting.

Miller (1967) provides an alternative approach to the problem by using force-field analysis. He applies this procedure to different socio-economic classes, for which he identifies alternative positive and negative forces encouraging and discouraging participation.

Verner & Davis (1964) reviewed the research literature on dropout and tested 26 personal and 18 situational factors which might contribute to
dropout. Their results, however, were inconclusive.

Dickinson & Verner (1967) report on their studies of attendance and dropout patterns in Canadian night school classes. They found that "In general, the persistent attenders were older, married house-wives who had children, while dropouts were younger and usually single." (p.24). A dropout was defined as one who was enrolled for the course but did not attend the final two sessions. Using this criterion they found an overall dropout of 27.8%, but in 'academic' subjects (including science courses) the average dropout was 39.1%. They found a similar differential in the average daily attendance, which was 63.5% overall, but only 52.9% for the academic subjects.

The University Extension Participant in New Zealand

Recent research by Boshier (1969, 1970 & 1971a) provides material specifically on participants in Victoria University Extension programs. The statistics, therefore, can be used as a basis for comparison with those of the present study.

With regard to the university extension participants, Boshier (1969, p.131) concluded that they "...were well educated, of high socio-economic status, mostly work in occupations which, for census purposes, are described as professional ... and have probably participated in some adult education activity before. If they were married, and have had a university education, they were less likely to drop-out than those who were single or of low educational attainment." He defined dropout, for most of his work, as "...a person, who, after being present for session 1 or 2 was absent for the mid-point session and four successive sessions of a continuing course." (1970, p.139).

Boshier (1969) found fewer men (35%) than women in the extension classes studied. Comparing the age distribution of the participant population with that of the adult population in the University Extension catchment area
(Boshier 1971a), he found the extension participants to be disproportionately young. The age figures were as follows (catchment area in parentheses):

- 15-19 years, 7\% (14\%); 20-29 years, 46\% (24\%); 30-39 years, 21\% (18\%); 40-49 years, 17\% (18\%); 50-59 years, 7\% (16\%); and 60-69 years, 2\% (10\%).

The distribution of highest academic qualification showed the university participant group to be essentially an educational elite when compared with the national averages. The figures (Boshier, 1971a) were as follows (national averages in parentheses):

- University degree or diploma, 28\% (2\%);
- Teachers' or technical certificate, 28\% (2\%);
- University entrance or higher school certificate, 17\% (4\%);
- School certificate, 13\% (5\%);
- Other qualification, 2\% (4\%);
- No formal qualification, 12\% (83\%).

In the national census data referred to, the category 'other qualification' is broken down into: higher trade (2\%), other trade (1\%) and business college or shorthand certificates (1\%).

Boshier (1971a) also found that, in terms of occupational categories, the university extension role was heavily skewed toward the upper end of the scale when compared with both the national average and the extension catchment area (the Wellington urban area). The figures were as follows (Wellington urban work-force in parentheses):

- Professional and technical, 50\% (14\%);
- Management and administration, 15\% (6\%);
- Clerical, and sales, 26\% (35\%);
- Skilled, semi-skilled and unskilled, 8\% (45\%);
- Military personnel, 1\% (<1\%).

Using the criterion mentioned earlier, Boshier (1969) found a dropout rate of 23\% in the general extension enrolment.

Bagnall (1975) compiled statistics on the participants in the first three experimental study-research group projects. Compared with Boshier's figures for the university extension role, he found an even higher proportion (47\%) with university degrees, a slightly higher proportion with no formal qualifications (17\%), more with 'other qualifications' (8\%),
fewer with teachers' or technical certificates as their highest qualification (6%), and a slightly lesser number with only university entrance or higher school certificate (14%), or with school certificate (8%).

He also obtained figures on previous participation in education within the discipline of the study-research group. Only eleven percent had not previously studied the subject. Twenty-five percent had done so as part of a university degree, and 64% in adult education programs through university extension or the Workers Education Association. These last two categories were not mutually exclusive.

He found no significant difference in the enrolment figures for men (51%) and women. While this contrasted markedly with Boshier's figures, statistics taken from two annual reports (Dakin, 1973, 1974) revealed that non-science extension classes (arts, humanities, commerce, law and languages) had a distribution similar to that shown by Boshier's study (30% men), but the sciences showed a distribution similar to that in the study-research groups (49% men).

Bagnall's figures for age distribution more closely followed the distribution of the Wellington urban area adult population than they did Boshier's figures for university extension participants. The figures were: 15-19 years (5%), 20-29 years (8%), 30-39 years (31%), 40-49 years (31%), 50-59 years (14%), and 60-69 years (11%).

Compared with Boshier's statistics the study-research groups, however, were more occupationally elitist, with 62% of the enrolment being professional and technical. The remaining distribution was: management and administration (5%), clerical and sales (5%), and skilled to unskilled (28%). This last figure, interestingly, being markedly higher than that in the general extension enrolment.

Bagnall also obtained data on the number of discipline-based societies to which a participant belonged and which were identifiable with
the subject of the study-research group. Eighty-five percent of the participants were found to belong to one or more such societies.

He found a dropout rate of only 5%, which he compared with "...other extension science courses where rates of 50% and over are common at the end of a course." (p.24). However, in terms of Boshier's definition there would have been no dropout in the study-research groups. Mean daily attendance was 84%. The average attendance was 71%, 81%, and 100% in each of the groups.
VII. MOTIVATIONAL FACTORS IN ADULT EDUCATION

Introduction

Adult educators have long been interested in the question of what motivates adults to participate in particular adult education activities. It is felt that a better knowledge of why participants are present will enable the instructor to more closely meet their needs, preventing them from dropping-out, and facilitating their learning of some relevant material.

Styler (1950) reported on motivational studies in Great Britain prior to that time. He notes a study by Flood & Crossland (no reference given) in which motives were classified into three groups: 1) 'vocational,' 2) 'general desire for knowledge,' and 3) 'societal and recreational.' Another reported study of tutorial class participants at Leeds recognized two categories: 1) 'personal and cultural,' and 2) 'social.'

Whipple (1957) accepted three motivational categories: 1) 'vocational appeal,' 2) 'negative forces of defense against losses,' and 3) 'the urge to study as a result of a vocational interest or ambitions.'

Dick (1964) claimed to have identified a factor of 'gregariousness,' on the grounds that adult education participants showed an overall higher did rate of participation in community activities than/non-participants. He apparently failed to appreciate that both adult education participation and participation in community activities are positively correlated with socio-economic status.

Two psychological theories of motivation and need are frequently referred to by adult educators interested in this problem. The first is Maslow's (1954) 'holistic-dynamic theory of human motivation.' In this theory, Maslow postulates a needs 'hierarchy of prepotency.' Under normal circumstances unless needs lower in the hierarchy (e.g. safety, belongingness) are substantially satisfied, those higher up (esteem,
self-actualization) will not be felt. The highest, and rarest, need is said to be self-actualization, referring to the persistent striving of persons in this category toward expression of their full human potential. In spite of the stated rarity of self-actualizing persons, most liberal adult education is scheduled on the basis of assumed motivation in this category.

The second general theory is that of Havighurst (1952) who postulated a series of developmental tasks which will become pressing at a certain time during human (including adult) development. These developmental tasks are said to be set by three forces: 1) the expectations of societal values, 2) the maturing and ageing of the body, and 3) the values and aspirations of the individual. The 'teachable moment,' at which an adult is most likely to learn relevant material, is at the time of personal realization of the need to cope with each developmental task (Havighurst & Orr, 1956).

However, the strongest conceptualizing force which has guided recent research into motivation appears to be the typology developed by Houle (1961). In this work he reports and discusses the results of detailed studies involving 22 selected continuing learners. Three types of orientation to learning were recognized: 1) 'goal-oriented' learners, those to whom education is a means to the accomplishment of fairly clear-cut objectives; 2) 'activity-oriented' learners who participate for reasons which have no necessary connection (and often none at all) to the announced purpose or content of the educational offering; and 3) 'learning-oriented' participants who are seeking knowledge for its own sake. This last category would coincide with Maslow's self-actualization class.

Motivational Factor Studies Based on Houle's Typology

At about the time of Houle's study, a new procedure for the analysis of motivational data became available to researchers. This procedure of
factor analysis has since been applied by a number of researchers studying a variety of adult learning groups in various countries. These authors have generally related their findings to Houle's typology and to the findings of previous factor analytic studies. The results and conclusions of most of these studies have been extensively reviewed elsewhere (Boshier, 1976; Dickinson & Clark, 1975), and no more than a summary is warranted here.

In each of these studies, one of three test item scales has been used: 1) Sheffield's (1964) 'continuing learning orientation index' (C.L.O.I.), 2) Boshier's (1971b) 'education participation scale' (E.P.S.), and 3) Burgess' (1971) 'reasons for educational participation' scale (R.E.P.).

Table 7 shows the distribution of factors obtained. From this, one can see that 12 factors have been identified by different authors, and of these only seven with any frequency (numbers 1, 2, 4, 5, 7, 8, & 12). It is important to note, in this regard, that the factors identified in a study are substantially dependent on the items which one uses in the survey instrument. As Boshier (1976, p.30) states, "...a factor can emerge simply because everyone in a sample indicated they were not enrolled for the reasons described."

For the purposes of comparison with the results of the present study, the following definitions have been accepted for the seven important factors identified in Table 7.

1) Personal goal. "The personal-goal oriented learners are those who use education as the means of accomplishing fairly clear-cut personal objectives." (Sheffield, 1964, p.17).

2) Professional goal. "The common theme ... is that participants are enrolled in order to acquire basic knowledge, attitudes, or skills that will help them obtain or hold jobs..."(Hagg, 1976, p.32).

4) Social welfare. "Individuals scoring high on this dimension view their education as preparation for participation in community affairs and 'service'
<table>
<thead>
<tr>
<th>Author</th>
<th>Factor</th>
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<tbody>
<tr>
<td>Houle (1961)</td>
<td>goal orientation</td>
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<td>Boshier (1971b) E.P.S.</td>
<td>goal orientation</td>
</tr>
<tr>
<td>Boshier (1977) E.P.S.</td>
<td>goal orientation</td>
</tr>
<tr>
<td>Burgess (1971) R.E.P.</td>
<td>desire to reach a personal goal</td>
</tr>
<tr>
<td>Dickinson &amp; Clark (1975) C.L.O.I.</td>
<td>occupational orientation, professional orientation, societal orientation</td>
</tr>
<tr>
<td>Grabowski (1976) R.E.P.</td>
<td>desire to reach a personal goal</td>
</tr>
<tr>
<td>Haag (1976) E.P.S.</td>
<td>job competence</td>
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<tr>
<td>Morstain &amp; Smart (1974) E.P.S.</td>
<td>professional advancement</td>
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<tr>
<td>Riddell (1976) E.P.S.</td>
<td>personal goal orientation</td>
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<tr>
<td>Sheffield (1964) C.L.O.I.</td>
<td>personal goal orientation</td>
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<tr>
<td>Zack (1976) E.P.S.</td>
<td>professional advancement</td>
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<td></td>
<td>1. personal goal</td>
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<td>2. professional goal</td>
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<td>3. intellectual security</td>
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<td>4. social welfare</td>
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<td>5. external expectations</td>
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<td>6. religious goal</td>
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TABLE 7(b)—Motivational factors identified by selected authors. The bottom row identifies the title used in this study. Abbreviations following authorities refer to the instrument used.

<table>
<thead>
<tr>
<th>Author</th>
<th>Factor</th>
<th>Learning orientation</th>
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<td>learning orientation</td>
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<td>E.P.S.</td>
<td>self vs. other centeredness</td>
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<td></td>
<td>social contact</td>
<td>educational preparation</td>
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<td>Boshier (1977)</td>
<td>E.P.S.</td>
<td>self vs. other centeredness</td>
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<td>Burgess (1971)</td>
<td>R.E.P.</td>
<td>self vs. other centeredness</td>
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<td></td>
<td>desire to escape</td>
<td>desire to know</td>
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<tr>
<td>Dickinson &amp;</td>
<td>relief from boredom &amp;</td>
<td>interactive</td>
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<tr>
<td>Clark (1975)</td>
<td>frustration</td>
<td>learning orientation</td>
</tr>
<tr>
<td>C.L.O.I.</td>
<td>sociability orientation</td>
<td>learning orientation</td>
</tr>
<tr>
<td>Grabowski (1976)</td>
<td>R.E.P.</td>
<td>desire to know</td>
</tr>
<tr>
<td></td>
<td>desire to escape</td>
<td>desire to know</td>
</tr>
<tr>
<td></td>
<td>desire to take part in social</td>
<td>desire to know</td>
</tr>
<tr>
<td></td>
<td>activity</td>
<td>desire to know</td>
</tr>
<tr>
<td>Haag (1976)</td>
<td>E.P.S.</td>
<td>desire to know</td>
</tr>
<tr>
<td></td>
<td>escape/stimulation</td>
<td>desire to know</td>
</tr>
<tr>
<td></td>
<td>social contact</td>
<td>cognitive interest</td>
</tr>
<tr>
<td>Morstain &amp;</td>
<td>escape/stimulation</td>
<td>social relationships</td>
</tr>
<tr>
<td>Smart (1974)</td>
<td>E.P.S.</td>
<td>cognitive interest</td>
</tr>
<tr>
<td>Riddell (1976)</td>
<td>E.P.S.</td>
<td>social contact</td>
</tr>
<tr>
<td></td>
<td>escape/stimulation</td>
<td>cognitive interest</td>
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<tr>
<td>Sheffield (1964)</td>
<td>C.L.O.I.</td>
<td>sociability orientation</td>
</tr>
<tr>
<td></td>
<td>need fulfillment orientation</td>
<td>learning orientation</td>
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<tr>
<td>Zack (1976)</td>
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</tr>
<tr>
<td></td>
<td>escape/stimulation</td>
<td>cognitive interest</td>
</tr>
<tr>
<td></td>
<td>7. escape/stimulation</td>
<td>8. social contact</td>
</tr>
<tr>
<td></td>
<td>9. individual study</td>
<td>10. activity need</td>
</tr>
<tr>
<td></td>
<td>11. self-other centeredness</td>
<td>12. cognitive interest</td>
</tr>
</tbody>
</table>
to mankind in general." (Morstain & Smart, 1974, p.87).

5) External expectations. "Individuals who score high on this factor are seeking to fulfill the expectations of others as opposed to their own intrinsic needs or desires." (Morstain & Smart, 1974, p.86).

7) Escape / stimutation. "...the desire to escape from some other activity or situation which is unpleasant or tedious." (Burgess, 1971, p.24). Also, "...Individuals who score high on this dimension tend to view their participation in college courses as a means of relief from everyday boredom and responsibilities, providing a contrast to their daily routine and overcoming the frustrations of day-to-day life." (Morstain & Smart, 1974, p.87).

8) Social contact. "...the desire to take part in a social activity because the activity is enjoyed for its own sake."(Burgess, 1971, pp.23-24).

12) Cognitive interest. "...a desire to gain knowledge for the sake of knowing: to grow in qualities and intellect and appreciation, to desire pleasure from learning, to enjoy mental exercises, and to remain in command of learning skills." (Burgess, 1971, p.18).

The general conclusion from straight factor studies is well stated by Sheffield (1964) who observes that all of the orientations identified are likely to be represented by adult learners in any given adult education group of any reasonable size, and that ..."Adult educators must recognize that adult learners come to continuing education activities with a variety of personal and educational objectives that are not necessarily consistent with the stated objective of the educational undertaking." (p.22).

Research Extending Motivational Factors

Miller & McGuire (1961) note that regardless of what is a particular participant's motivation for attending, it is unlikely to coincide with the aim of the instructor. As a way of alleviating this they propose the application of 'dissonance theory,' which has relevance to the study-research
group process. To quote, "...if the instructor creates dissonance by, for example, presenting the student with a considerable number of reasonable solutions to some single problem, he may create a situation which motivates the student toward adopting more rational modes of behaving in situations that require a judgement." (p.26).

Sheffield (1964) found the participant scoring on cognitive interest and social welfare factors to be positively correlated with participation and adult education activities.

Boshier (1973) discusses a growth-deficiency model, in which participants are regarded as either 'growth motivated' or 'deficiency motivated.' Growth motivated individuals are said to be 'expressing rather than coping,' and impelled primarily by inner determinants, whereas deficiency motivated persons are impelled by environmental factors and social pressure. Later, Boshier (1977) renamed these 'life-chance' (=deficiency) and 'life space' (=growth) motivations. Motivational factors identified with life-chance are: escape/stimulation, professional goal and external expectations. Those identified with life space are social welfare and cognitive interest.

Testing some of the implications of this model with regard to selected independent variables Haag (1976) concluded that "...continuous learners tended to be growth motivated while sporadic learners tended to be deficiency motivated. Older participants, in comparison to younger participants, were growth motivated while younger participants were deficiency motivated. High socio-economic status participants tended to be growth motivated while low socio-economic participants tended to be deficiency motivated." (p.ii).

Riddell (1976) examined the relationship between the escape/stimulation factor and psycho-social variables among older adults. She found that "Respondents motivated to attend for Escape/Stimulation manifested low levels of life satisfaction, adjustment to developmental tasks of later
life and social participation ... [They also] tended to have lower educational background and previous job level than those who were not motivated by Escape/Stimulation motives."(p.i).

Boshier (1977), however, found somewhat contradictory results in a study of his life-space, life-chance model, and concluded, ..."The fact that several variables correlated with some 'life-chance' factors and not others suggests the life-chance/life-space continuum may not be as unitary as was suggested..."(p.112). But he did find a positive correlation between socio-economic indices and life-space motivation.

Peters & Boshier (1976), in summarizing the findings of motivational research observe, ..."Motives for participation appear to be surface manifestations of psychological states which are in turn related to developmental tasks and psycho-social conditions that characterize various age and socio-economic groups."(p.204).

Motivational Factors in Relation to Science Adult Education

The author is not aware of any recent studies in which the motivational factors in science or research-based adult education are specifically considered. However, the key conclusion from the foregoing review — that most adult learning groups of a reasonable size are likely to include learners with all of the main motivational orientations — is probably generalizable to this area.

In his review of the British motivational literature Styler (1950) draws two relevant conclusions: 1) "In Social and Political subjects, and in the Natural Sciences, the chief motive is interest in the world in which the students live."(p.110) and 2) "Vocational motives appear to be more powerful in the natural sciences than in any other subject."(p.111). Such statements, the second in particular, must be regarded as potentially dependent on the type of courses studied.
Emmelin (1976) relates the findings expressed by Styler to the poor development of adult education in the field of environmental science. "Motives for participating in most adult education programmes are related either to expectations of better jobs due to increased knowledge and/or artificiation, or to hobby interests. This may be [the] reason for the lack of parallel increase in environmental education with adult education ... At present, job expectations will bring only a small proportion of the adult population to environmental education. The importance of conservation education, which broadens to environmental education, has been pointed out and is relevant to hobby interests."(p.51).

The Relationship Between Motivation and Interest

For the purposes of interpreting questionnaire results, the relationship between motivation and interests is of importance, since many participants would have difficulty in differentiating one from the other.

Atwood & Ellis (1971) see an interest as being closely akin to a 'felt need,' which is "...something regarded as necessary by the person or persons concerned,"(p.212). Bergevin et al (1963, p.29) view the relationship thus, ..."Needs and interests are interrelated. Interests usually point toward needs. An interest is usually the expression of a need we feel. When our needs and interests coincide we are usually motivated toward a learning experience." Gagné (1976, pp.28-29) sees an even more direct relationship, ..."The preparation for learning is accomplished by instruction which activates motivation by appealing to student interests." Miller & McGuire (1961) take an instructionally similar view in their discussion of setting objectives for the evaluation of liberal studies programs. They suggest that if one's category of behavioral concern is motivation, then one's objectives and the evaluation items should be addressed to participant interests.
VIII. PROGRAM DESIGN AND PUBLICITY

The process being evaluated in this study has been identified as a technique. Features of the programming method in which the technique was structured are, therefore, strictly not validly included in the evaluation. However, the assumption should be made that most participants would not be able fully to separate components of the technique from those of the method.

Programming then becomes a feature of the evaluation in that any major incongruency, between participant preferences and the actual structure of the program in which the technique is run and tested, is likely to be generalized by participants. The incongruency could thereby affect the participants evaluation of the technique. This would be so particularly when variables such as dropout rate are being used as a measure of participant identification with the technique. But, more generally, an individual highly incongruent with one aspect of the program, would find it very difficult to avoid letting this color his or her attitude to other aspects.

Another area of program importance in this regard is the adequacy with which the pre-enrolment brochure described important features of the course. Clearly, if the brochure is misleading, or inadequately describes the processes involved, persons may enrol on the basis of factors perceived in the brochure or inferred from it but which are not features of the course. If this occurs the resulting dissatisfaction could seriously affect the evaluation.
IX. SUMMARY AND RESEARCH HYPOTHESES

Summary

The foregoing review provides a conceptual basis on which to base an evaluation of the technique.

Section I shows the nature of the program into which the technique being evaluated was structured; the conclusion being that the program was of the liberal studies type.

Section II looks at the kinds of needs which lay behind development of the technique. These were, particularly, related to the necessity for a technique which provided instruction in the sciences with emphasis on cognitive research skills rather than verbal information and motor skill learning.

Section III gives a brief overview of learning theories applicable to adult education. One theory, Gagné's Learning Systems theory is outlined in greater detail because of its greater suitability over a variety of adult instructional situations. The learning outcomes in Gagné's model were chosen for use in the evaluation.

Section IV covers processes of adult education. The process being evaluated is categorized as a technique and, for comparative purposes, a tentative classification of techniques is developed. The categories in this classification are then related to the desired learning outcomes, both from a literature research and semi-theoretically on the basis of information about each technique category. The relative generalizability of techniques and devices is considered since it could have a bearing on more widespread use of the technique. Finally, research-based education is analyzed in terms of learning outcomes, so that appropriate emphasis may be placed on particular outcomes in the evaluation.
Section V is a summative review of adult education principles. The principles identified provide an additional set of target variables which are more learner-centered than the content-oriented learning outcomes of Gagné's theory.

Section VI is a brief examination of background and participational patterns of adult education participants, especially those in New Zealand university extension programs. The studies selected for more detailed summary are concerned with programs which are closely identifiable with the one being studied. They thus provide a point of reference for the present study.

Section VII is a review of the motivational orientation literature, the purpose being to identify motivational factors which may be expressed by participants in this program. Derivative studies, in which the factors are related to other variables, are only briefly reviewed since the present study is not designed to provide for such analysis.

Section VIII identifies the relationship between participant evaluation of the technique and reaction to components of program design and management. On the basis of the perceived relationship it is argued that programming features should be taken into account in technique evaluation.

**Research Hypotheses**

From the foregoing conceptual base, the following research hypotheses were generated as a basis for the evaluation.

1) **General Hypothesis**

That the technique, as evaluated by the participants, is a satisfactory one for the learning of research-based content, to the extent that no more than 25% of the respondents rate the technique as poorly or doubtfully suitable for attainment of the learning outcomes.
Specific Hypotheses:

a) that no more than 25% of respondents rate the technique as poorly or doubtfully suitable as a means of integrating the learning of verbal information with that of the appropriate skills by which the information can be applied to the solution of problems;

b) that no more than 25% of respondents rate the technique as poorly or doubtfully suitable as a means of developing higher order rules and cognitive strategies for the solution of problems;

c) that no more than 25% of respondents rate the technique as poorly or doubtfully suitable as a means of developing a more informed and critical attitude toward research.

2) General Hypothesis

That the technique conforms to important principles of adult education, to the extent that no more than 12% of respondents rate the technique as unsuitable for realization of the principles.

Specific Hypotheses:

a) that no more than 12% of respondents rate the technique as unsuitable as a means of maintaining high motivation;

b) that, as reflections of motivation, mean daily attendance is greater than 55%, and dropout (using Boshier's criterion) is less than 20%;

c) that no more than 12% of respondents rate the technique as unsuitable as a means of facilitating individual pace of learning and level of involvement;

d) that no more than 12% of respondents rate the technique as unsuitable as a means of providing for practice with reinforcement of correct behavior;

e) that no more than 12% of respondents rate the technique as unsuitable as a means of utilizing group influences on learning;

f) that no more than 12% of respondents rate the technique as unsuitable as a means of ensuring relevance of the material to the learner;
g) that no more than 12% of respondents rate the technique as unsuitable as a means of ensuring meaningfulness of the material to the learner;

h) that no more than 12% of respondents rate the technique as unsuitable as a means of enabling individuals to utilize their previous learning;

i) that no more than 12% of respondents rate the technique as unsuitable as a means of facilitating learner self-evaluation.

3) General Hypothesis

That the technique can provide, simultaneously in one class, meaningful educational experiences for individuals of widely varying pre-entry educational, biological, and socio-economic backgrounds.

Specific Hypotheses:

a) that there is no significant correlation between participant age and the learning evaluation and response scores;

b) that there is no significant correlation between sex of the participants and the learning evaluation and response scores;

c) that there is no significant correlation between socio-economic status and the learning evaluation and response scores;

d) that there is no significant correlation between background in research and the learning evaluation and response scores;

e) that there is no significant correlation between previous formal non-credit study in the discipline of the study-research group and the learning evaluation and response scores;

f) that there is no significant correlation between previous formal credit study in the discipline of the study-research group and the learning evaluation and response scores;

g) that there is no significant correlation between the previous number of adult education courses taken and the learning evaluation and response scores;

h) that there is no significant correlation between the highest level of certificated academic attainment and the learning evaluation and response scores;
scores;
i) that there is no significant correlation between the type of adult education institution previously attended and the learning evaluation and response scores;
j) that respondent evaluation of background adequacy, between those participants with, and those without a background in research, does not differ by more than 25% in any one category.

4) **General Hypothesis**
That the technique can satisfy a wide range of course-entry motivations.

**Specific Hypothesis**
a) That the correlations between scoring of important course-entry motivational items and satisfaction of the associated expectations are either weak or positive.

5) **General Hypothesis**
That, within the limits of the test items used, motivational orientations of the participants are similar to those identified in other studies.

**Specific Hypothesis**
a) That a factor analysis of the course-entry motivational items will reveal factors similar to those identified in other studies in so far as appropriate items are included in the instrument.

6) **General Hypothesis**
That meaningful participational factors can be identified and related to the motivational factors, and together form a basis for the identification of participants in each study-research group.

**Specific Hypotheses:**
a) that meaningful participational factors exist among the items pertaining to: educational background, socio-economic status, personal attributes, evaluation of the technique, and preferred structuring of such programs;
b) that these participational factors can be related meaningfully to the motivational factors;
c) that the respondent scores on the motivational and participational factors can be used to provide a reasonable measure of identification for participants of each study-research group.

7) General Hypothesis
That participants express general satisfaction with the program design and publicity, in that the type of structure preferred is closely similar to that of the program participated in.

Specific Hypotheses:

a) that the majority of respondents prefer course reading material to be a mixture of hand-out papers and references given;
b) that not more than 12% of the respondents prefer a mean group size outside the range of 10-20 persons;
c) that not more than 25% of the respondents indicate dissatisfaction with the lack of intergroup contact during the course;
d) that not more than 25% of the respondents prefer prescheduling of meetings to scheduling by the group;
e) that not more than 25% of the respondents prefer half-day length meetings to full-day meetings;
f) that not more than 25% of the respondents consider the course to have been too long;
g) that not more than 12% of the respondents express the desire for more formal instruction, a formal prerequisite course, or for better structuring of the program;
h) that, with regard to 1) the nature of the course subject matter, 2) the course technique, and 3) the expected time commitment, not more than 12% of the respondents score as poor the descriptive information in the program brochure.
CHAPTER III

METHODS

I. THE EVALUATION INSTRUMENT

The evaluation is based on a questionnaire (App.C) mailed to each participant five weeks after termination of the course. A personal letter (App.B) accompanied the questionnaire.

Towards the end of the course specific mention was made to participants of an impending questionnaire, and of the desirability of their completing and returning it. The time lag between course termination and distribution of the questionnaire was intended to give participants the opportunity to consider and evaluate their attitudes to the program.

The items in the questionnaire are derived from the conceptual basis to the study, through the research hypotheses. However, some variations should be noted.

Firstly, in formulating questions on learning outcomes it was not considered to be good procedure to separate motor skill learning from intellectual skills since the former were appropriate in only five of the six groups. In terms of the desired learning outcomes, motor skills were to be learned, in any case, only as far as was necessary for the achievement of each problem-solving task. Also, no specific mention was made of cognitive strategies since, as a concept, they are difficult to comprehend, and by their nature cannot be assessed reliably through a subjective questionnaire. However, a general question directed toward this skill was included in the questionnaire.

Secondly not all of the identified principles of adult education were included in the questionnaire. Specifically, the following were
excluded: numbers two and seven ('maintain adult autonomy' and 'provide a secure learning environment') since these were considered to be more a function of individual instructor style and ability, than a characteristic of the technique used; number four ('make allowance for psychological and physiological ages') since this was covered by number three ('allow for individual pace and level of learning'); numbers 11 and 13 ('ensure active involvement in learning' and 'provide for learner involvement in course planning and management') since they are so fundamental to the technique that a question on them would not be meaningful to participants; and numbers 12, 14 and 15 ('provide for learner involvement in needs diagnosis,' 'ensure learner knowledge of expected behavior' and 'facilitate learner awareness of behavioral inadequacy') because the concepts involved would have been confusing, for many participants, in relation to the project. This last class of principles is, nevertheless, considered to be a feature of the technique.

Thirdly, in choosing course-entry motivational items, it was intended to keep the section as small as possible. The need for this arose out of the already discouragingly large size of the questionnaire. Course-entry motivations, while very interesting, were not an essential component of the evaluation, so their number was kept small. Rather than attempt to decimate the items on instruments such as Boshier's Educational Participation Scale, it was decided to use a set of items from an earlier evaluation of the study-research group technique (Bagnall, 1975) and thereby to at least retain some comparability.

The distribution of usable questionnaire returns across the groups is shown in Table 8. The total of 65 represents a 77% return on the original enrolment.
TABLE 8 — Usable questionnaire returns in relation to the total enrolment in each group.

<table>
<thead>
<tr>
<th></th>
<th>History</th>
<th>Geology</th>
<th>Botany</th>
<th>F'w. Biology</th>
<th>Ornith.</th>
<th>Mammal.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolments</td>
<td>15</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>9</td>
<td>14</td>
<td>84</td>
</tr>
<tr>
<td>Returns</td>
<td>8</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>6</td>
<td>11</td>
<td>65</td>
</tr>
</tbody>
</table>

II. VARIABLES USED IN THE ANALYSIS

Most of the variables used in the analysis were derived directly from the questionnaire items. The exceptions are noted here.

Firstly, 'occupation' was converted into a socio-economic status index on the basis of the scale developed by Elley & Irving (1972). This scale has been developed from New Zealand census data by using occupational categories and weighting them with an index comprising median educational attainment and income (equally weighted) of individuals in the occupational category. Only the six major socio-economic categories of Elley & Irving were used, each participant being placed in one of these from the seventy occupations identified by the authors. The scale is, unfortunately, based only on the male working population, as are the following figures of national distribution in each class, 'one' being the highest class: one (5.8%), two (19.3%), three (13.3%), four (28.2%), five (21.3%), and six (12.1%). However, in the present study all retired persons, housewives, etc. were placed according to their previous occupational level.

Secondly, a dichotomous variable ('with' or 'without') was developed to measure whether an individual had some occupational or higher educational background in research. It was derived from the given information on occupation and education. Only a post-graduate degree was taken as educational evidence of research background. Positions such as technician and scientist were accepted as occupational evidence of a research background.
Thirdly, a total number of adult education courses previously taken was obtained from summing those relevant to the discipline of the group, and 'other' such courses.

Fourthly, in coding the organizing institution for the adult education courses taken, an ordinal variable was created by scaling the institution in terms of its institutional similarity with university extension (4 = university, 3 = W.E.A., 2 = secondary school evening class, 1 = other). Each respondent was scored only according to his or her highest institution on this scale.

Fifthly, in coding the responses to the question on preferred group size of study-research groups, a number of respondents gave a range. Because responses were coded as absolute numbers, in these cases the midpoint of the range was recorded.

Finally, in cases where respondents were invited to comment on their replies to previous questions, the comments were clustered on the basis of content similarity.

III. ANALYSIS OF THE DATA

1. For the general hypotheses numbers 1 - 4 and 7 (sections I - V and VIII in the results), the following statistics were derived from the relevant items: mean univariate frequency distribution and total percentage distribution. Where bivariate analyses were required, the statistics obtained were: frequency distribution, horizontal percentage, vertical percentage, total percentage, chi square analysis with probability, and a correlation coefficient with probability.

The correlation coefficient in any particular case was obtained with the appropriate method for the type of data (Freeman, 1965): 1) for ordinal-ordinal variables, Goodman's and Kruskal's gamma ($\gamma$); 2) for
nominal-ordinal variables, Freeman's coefficient of determination, theta ($\phi$); and 3) for nominal-nominal variables, Guttman's lambda ($\lambda$).

2. For general hypotheses 5 and 6 (sections VI & VII in the results) the following procedures were used (Gorsuch, 1974).

The motivational items (App.D) were factored from a correlation matrix on the raw scoring of each item. Item eight ('it let me out of some domestic chores') was eliminated as it included no score above zero. All seven factors with eigenvalues greater than 1.0 were orthogonally rotated using the Varimax procedure to permit comparison with the participational factors. Factor scores, computed from regression coefficients, were normalized so that factor score covariances equalled zero. Items were included in a factor only if they showed a minimum loading of $\pm 0.4$, and were then used as the basis for identification of the factors.

Participational items (App.D) were factored from a correlation matrix based on the raw scoring of each item. Eleven factors emerged with eigenvalues greater than one. These were obliquely rotated using Kaiser's 'little jiffy' procedure. The factors were identified primarily on the basis of items which had minimum loadings of 0.4. Factor scores were produced from regression coefficients. Inter-factor correlation coefficients and covariances were calculated from the factor loadings and factor scores.

To uncover interrelationships among clusters of motivational and participational issues, a second factoring and rotation, this time oblique, was limited to eight factors. These were given factor scores and identified with the same procedure as outlined for the motivational factors.

To test the relationship between the orthogonally rotated motivational and participational factors correlation coefficients of the factor scores were determined.

Stepwise discriminant analysis was used to test the degree to which
the factors were functions of study-research group membership. This was
done by taking the groups as independent variables, and the motivational and
participational factors as dependent variables, with participant factor
scores as the scale items. Inclusion of both sets of factors was justified
on the grounds of the low correlation coefficients between factors in the
two sets. The analysis involved the computation of a set of linear classifi-
cation functions by choosing independent variables in a stepwise manner until
the F-probabilities exceeded 0.05. Canonical variables were used to predict
the group to which each respondent should belong, using two procedures:
1) the standard method (Kelly et al, 1969) which uses the origin of the
pooled means of the original variables in evaluating the canonical
variables, and 2) Cooley & Lohnes' (1962) 'centroid' procedure.
CHAPTER IV

RESULTS

I. CHARACTERISTICS OF THE PARTICIPANTS

Sex
The participant population was slightly predominated by men (57%). This is intermediate between the approximately equal distribution found in science extension courses, and the women-dominated general extension role (65% women).

Age
The age distribution of participants is shown, with others for comparison, in Figure 3. The distribution is generally more similar to that of the previous study-research groups and the Wellington adult urban population than it is to the general extension enrolment. The peak in participation between 20 and 29 years, found by Boshier, is not present. The participant population is uniformly older, with higher percentages in the 30 and over groups and lower percentages below 30 than are recorded by Boshier. In fact, there are no participants recorded below 20 years of age.

Socio-Economic Status
The participant distribution on the basis of socio-economic status is shown, with the New Zealand adult male distribution, in Figure 4. The figures reveal an extremely skewed distribution of the participant population toward the higher socio-economic categories.

The categories are not necessarily strictly comparable to those of Boshier (1971a) or Bagnall (1975). However, classes one, two and three
FIGURE 3

Age distributions of four groups: the participants, the university extension enrolment in 1969, the adult population of the Wellington urban area (both Boshier, 1971a), and the earlier study-research group participants (Bagnall, 1975)
FIGURE 4
Socio-economic status distribution of participants compared with the New Zealand adult male population (Elley & Irving, 1972)

New Zealand adult male population
participant population

% in each class

professional & technical
management & admin.
clerical & sales
skilled
semiskilled
unskilled

socio-economic status classes
of the present study are approximately equivalent to: 1 — professional and technical, 2 — management and administration, and 3 — clerical and sales. Classes four, five and six, together, are approximately equivalent to the category of skilled, semiskilled and unskilled.

Despite limitations to direct comparability, the ratios in Table 9 give a reasonable idea of the comparative distributions within the three studies. The table shows that in class one (professional and technical), participants were disproportionately represented relative to the national population by a factor of 9.6. In the previous study-research group evaluation, the ratio of participants to Wellington urban population was 4.4, and in Boshier's study of the general extension participant population, 3.6. The markedly greater representation in the present study compared with the previous two probably would be reduced somewhat if the divisor were the Wellington work-force figure and not the national figure. However, the even greater socio-economic elitism of the participants in this program relative to those of the earlier studies would remain. The ratios in the other classes are similar between studies excepting the greater representation of class three (clerical and sales) in the present case.

Educational Background

The distribution of highest academic qualifications (fig.5) compares closely with that of the earlier study-research groups, excepting the higher proportion in the "teachers or technical certificate' category — probably reflecting a greater proportion of teachers in the present study. This relative increase in certificated participants was not taken from the degree-holding class (which is slightly greater) but from all of the lower categories.

The distribution of participant's highest qualifications follows the same trend as that of the general extension population, which shows a disproportionate representation of the better qualified citizenry, especially
those with university degrees and certificates. While this is an attribute of adult education in general, and of university extension in particular, it is even more marked in the study-research group participant population.

TABLE 9 — Ratios by socio-economic class, of: 1) general extension enrolment and the Wellington urban population (Boshier, 1971a), 2) early study-research group participants and the Wellington urban population (Bagnall, 1975), and 3) participants in the present program and the New Zealand adult male population.

<table>
<thead>
<tr>
<th>Population (Ratio Dividend)</th>
<th>Socio-Economic Class</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 professional &amp; technical</td>
<td>2 management &amp; administration</td>
<td>3 clerical &amp; sales</td>
<td>4, 5 &amp; 6 skilled, semiskilled, unskilled</td>
</tr>
<tr>
<td>1) university extension</td>
<td>3.6</td>
<td>2.5</td>
<td>0.7</td>
<td>0.2</td>
</tr>
<tr>
<td>2) early study-research groups</td>
<td>4.4</td>
<td>0.8</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>3) participants in present program</td>
<td>9.6</td>
<td>1.0</td>
<td>1.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Figure 6 shows the distribution of previous credit study in the discipline of the study-research group to which each participant belonged. The pattern is similar to that found for the earlier study-research group participants in which 25% had university-level experience (29% in the present study), and 20% had other tertiary or upper-level secondary school work (18% in the present study).

The distribution of previous adult-education courses (non-credit) taken in the discipline of the participant's study-research group (fig. 7) shows a marked reduction in the present study. Only 20% had taken two or more courses (61% in the earlier study), although 11% had taken one course (3% in the earlier study). However, the percentage of participants who had previously taken one or more adult education courses in any subject (fig. 8) was up to 75%.
Highest academic qualifications of four groups: the participants, the New Zealand adult population, the general university extension enrolment (Boshier, 1971a), and the earlier study-research group participants (Bagnall, 1975).

- National average
- University extension enrolment
- Earlier study-research groups
- The present study

<table>
<thead>
<tr>
<th>Qualification</th>
<th>National Average</th>
<th>University Extension</th>
<th>Earlier Study</th>
<th>Present Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td>83</td>
<td>50</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Honors or Masters</td>
<td></td>
<td>28</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td></td>
<td>28</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Highest academic qualification</td>
<td>50</td>
<td>17</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Other qualifications</td>
<td></td>
<td>13</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>No formal qualification</td>
<td></td>
<td>12</td>
<td>17</td>
<td>11</td>
</tr>
</tbody>
</table>

The diagram shows the percentage of individuals in each class with the highest academic qualification.
FIGURE 6
Previous credit education in the discipline of the study-research group.

FIGURE 7
Previous non-credit (adult) education in the discipline of the study-research group.
FIGURE 8
Total number of previous adult education (non-credit) courses taken in all subjects.

FIGURE 9
Organizing institution for previously taken adult education courses. Only one institution—that most closely identifiable with the university—is plotted for each participant.
Combining the preceding two items, it is found that only 35% of the respondents had neither credit nor non-credit prior education in the discipline of their study-research groups.

From Figure 9 it can be seen that of those participants who previously had taken adult education courses (75% of respondents), 82% had taken one or more with the university, 10% with the Workers Education Association (W.E.A.) and the remaining 8% from other institutions. This represents a strong prior identification with university extension work.

The general skewing toward high previous educational involvement in the discipline of the group and in university extension courses in general, may well be related partly to the course publicity procedures. Fifty-two percent of respondents indicated that they first heard of the project on receiving a copy of the brochure. These persons must all have been identified by the university extension staff as individuals with a previous involvement in extension or a discipline-based society. Of the remaining 48 percent of respondents, the distribution of first knowledge of the project was as follows: personal contact, 14%; seeing the brochure on a notice board or similar place, 14%; verbal information from extension department staff, 9%; from reading a newspaper article, 6%; or a newspaper advertisement, 5%.

Forty-six percent of the participants were considered to have a background in research, either through postgraduate study or through their occupations.

Conclusions

The participant group reflected, reasonably closely, the adult population of the catchment area with regard to sex and age distributions. However, the distributions of socio-economic status and highest academic qualifications show the participants to have been disproportionately inclusive
of the high status and better educated groups. Thus, the program evidently was more attractive to persons in such groups, either through its own appeal, or through the selective directing of publicity. The fact that 75% of the respondents had studied previously in adult education courses, and of these 85% with university extension, suggests that selective publicity may be an important factor.

There was a general, although not disturbingly high, proportion of respondents (65%) who had participated previously in education concerned with the discipline of their group. It can be concluded that many of these persons had not studied the subject for some time. This is supported by the fact that only 31% of the respondents had attended previously adult education courses in the discipline of their group, together with the predominantly middle-aged respondent population, and the generally undergraduate or lower distribution of previous credit study.
II. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO THE LEARNING OF RESEARCH-BASED CONTENT

The general hypothesis for this section is that the technique, as evaluated by the participants, is a satisfactory one for the learning of research-based content, to the extent that no more than 25% of the respondents rate the technique as poorly or doubtfully suitable for attainment of the learning outcomes. Each of the three specific hypotheses is directed to a learning outcome identified as important in the conceptual basis for the study. These outcomes (higher intellectual skills, cognitive strategies, and attitude to research) were associated with four items in the evaluation questionnaire.

Since, in this section, the interpretation of results of each questionnaire item is critically dependent on the form of the question, the essential components of each question are repeated here:
1) the technique provides a means of teaching research-based subjects as they really are, namely an integration of existing information and research;
2) an object of the project was to increase your understanding of the study-research group subject as a field of study (not merely as a collection of facts and explanations);
3) an objective of the project was to increase your ability to analyze, criticize and appreciate the limitations of research work in the area of study;
4) the technique develops in students a more informed and critical attitude towards research.

Items 1 and 2 above were intended to relate to an emphasis on intellectual skill learning, with verbal information as a means to application of the skills (research hypothesis 1a). Item 3 was conceived
as relating to the development of higher order rules and cognitive strategies (hypothesis 1b), and item 4 to the development of a more informed and critical attitude toward research (hypothesis 1c).

The results are shown in Table 10. Each of the specific hypotheses is confirmed in that for none of the items does the scoring in the lower two categories exceed 25%. However, for each of the learning outcomes there is an important number of negative evaluations: 4% and 16% on the items relating to the integration of verbal information and skill learning; 16% on the item relating to higher order rules and cognitive strategies; and 14% on the item relating to attitudinal learning.

TABLE 10 — Response to questionnaire items relating to learning outcomes. Asterisk indicates that the category was not offered in the questionnaire.

<table>
<thead>
<tr>
<th>Item</th>
<th>Respondent Evaluation of Outcome (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>poorly (1)</td>
</tr>
<tr>
<td>1) integration of information and research</td>
<td>-</td>
</tr>
<tr>
<td>2) the subject as a research field</td>
<td>16</td>
</tr>
<tr>
<td>3) critical research ability</td>
<td>16</td>
</tr>
<tr>
<td>4) critical attitude</td>
<td>-</td>
</tr>
</tbody>
</table>

To ascertain whether or not the responses to these items tended toward uniformity (and hence would be strongly positively correlated), the correlation coefficients were calculated and are shown in Table 11.

From the table it is evident the general trend is for a positive correlation. However, only two coefficients show a significantly high probability of correlation (integration of information and research with critical research ability; integration of information and research with the
subject as a research field). From an examination of the questionnaire items one could tentatively conclude that items 1 and 2 (integration of information and research; the subject as a research field) were contributory factors to item 3 (critical research ability) — hence the significance of the correlations — but were not seen by respondents as identical measures of the one quality — hence the somewhat lower correlation between 1 and 2.

**TABLE 11** — Correlation coefficients between learning outcome scores. Double asterisk indicates a highly significant probability of correlation ($p = 0.01$). Single asterisk indicates significance ($p = 0.05$).

| 1. integration of information and research | 0.51* |
| 2. the subject as a research field | 0.56** |
| 3. critical research ability | 0.84** |
| 4. critical attitude. | 0.53* 0.42* 0.33 |

The generally high correlations do, however, suggest that respondents tended to react similarly with respect to this group of items. This, in turn, leads one to hypothesize a correlation between scoring of these items and some linking (possibly causative) factor. Educational, socio-economic background, and biological items are examined in section 3. Two other key variables are attendance, and the group to which participants belonged. The correlation coefficients for these items against the learning outcome scores are shown in Table 12. As can be seen, there are no high or significant correlations present, refuting any univariate causal relationship between either group membership or attendance record and the learning outcome evaluations.

The hypotheses in this section are thus confirmed, in that the technique, as evaluated by the participants, is seen as a satisfactory one for the learning of research-based content.
TABLE 12 — Correlation coefficients among attendance, group membership, and the learning outcome scores. None of the item pairs shows a significant probability of correlation (p = 0.05).

<table>
<thead>
<tr>
<th>Outcome Items</th>
<th>% meetings attended</th>
<th>group to which belonged</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. integration of information and research</td>
<td>0.14</td>
<td>0.27</td>
</tr>
<tr>
<td>2. the subject as a research field</td>
<td>0.27</td>
<td>0.19</td>
</tr>
<tr>
<td>3. critical research ability</td>
<td>0.21</td>
<td>0.27</td>
</tr>
<tr>
<td>4. critical attitude</td>
<td>0.13</td>
<td>0.18</td>
</tr>
</tbody>
</table>
III. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PRINCIPLES OF ADULT EDUCATION

The general hypothesis for this section is that the technique conforms to important principles of adult education, to the extent that no more than 12% of respondents rate the technique as unsuitable for realization of the principles. Eight of the nine specific hypotheses relate to participant scoring of a principle identified in the conceptual basis to this study. Specific hypothesis 2b relates a higher-than-average attendance (>55%) and a lower-than-average dropout (<20%) to high motivation.

The scoring of adult education principles is presented in Table 13. There is a marked skewing toward positive identification of the technique with the realization of each principle. Facilitating learner self-evaluation shows the highest scoring of doubtful association with the technique. This may be related to an over-emphasis on group activities in at least some of the groups.

Each of the specific hypotheses relating to an adult education principle is confirmed, in that for none of them was the technique rated as unsuitable (the 'strongly disagree' category) by more than 12% of the respondents. The proportion of respondents who were doubtful that the technique was particularly suitable for realization of the principles was somewhat higher. However, only principle number 8 (facilitate learner self-evaluation) shows a high scoring (33%) in this category.

The intercorrelations among scoring of these eight principles are shown in Table 14. Most of the intercorrelations are positive and have a significant probability. Only four of the eight items show some tendency towards independence: 3 - practice with reinforcement (which is less strongly correlated with individual pace and level, relevance, and utilizing previous learning); 7 - utilizing previous learning (which is less strongly correlated...
TABLE 13 — Participant evaluations of the extent to which the project realized the principles of adult education.

<table>
<thead>
<tr>
<th>Adult Education Principle</th>
<th>Participant Agreement that the Principle Applies to the Technique (% Respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>strongly disagree 1</td>
</tr>
<tr>
<td>1. ensure high motivation to learning</td>
<td>-</td>
</tr>
<tr>
<td>2. allow for individual pace and level of learning</td>
<td>5</td>
</tr>
<tr>
<td>3. provide for practice with reinforcement of correct behavior</td>
<td>-</td>
</tr>
<tr>
<td>4. utilize group influences on learning</td>
<td>-</td>
</tr>
<tr>
<td>5. ensure relevance of the material to the learner</td>
<td>-</td>
</tr>
<tr>
<td>6. ensure meaningfulness of the material to the learner</td>
<td>2</td>
</tr>
<tr>
<td>7. enable individuals to utilize previous learning</td>
<td>-</td>
</tr>
<tr>
<td>8. facilitate learner self-evaluation</td>
<td>-</td>
</tr>
</tbody>
</table>

TABLE 14 — Correlation coefficients among scoring of adult education principles. Item numbers are those used in Table 13 and the covering text. Double asterisk indicates a highly significant probability of correlation (p = 0.01); single asterisk indicates significance (p = 0.05).

<table>
<thead>
<tr>
<th>1. ensure high motivation</th>
<th>0.60**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. allow for individual pace &amp; level</td>
<td>0.40*</td>
</tr>
<tr>
<td>3. provide for practice with reinforcement</td>
<td>0.72**</td>
</tr>
<tr>
<td>4. utilize group influences</td>
<td>0.54*</td>
</tr>
<tr>
<td>5. ensure relevance of material</td>
<td>0.58*</td>
</tr>
<tr>
<td>6. ensure meaningfulness of material</td>
<td>0.38</td>
</tr>
<tr>
<td>7. utilize previous learning</td>
<td>0.65**</td>
</tr>
<tr>
<td>8. facilitate learner self-evaluation</td>
<td>0.66**</td>
</tr>
</tbody>
</table>

1 2 3 4 5 6 7
with practice with reinforcement, high motivation, utilizing group influences, and self-evaluation); 4 — utilizing group influences (in relation to meaningfulness and relevance); and 2 — individual pace and level (with meaningfulness). The principles of adult education are thus reflecting a general attitude to the technique.

Hypothesis 2b relates to attendance and dropout to motivation. The average daily attendance across all groups was 60%. This is somewhat higher than Dickinson's and Verner's figure of 53% for academic subjects. However, the latter figure was based on courses which were, in general, considerably storter and required much less class-time than did the program here studied. Dickinson & Verner show that length of course and dropout (and hence average attendance) are positively correlated. Bagnall recorded higher attendance figures in earlier study-research courses than that noted here.

The average daily attendance of the respondents (as differentiated from the participants) was 70%. Since this is based on participant's memory of their previous record, it is possible that it is exaggerated. Nevertheless, one should be alert to the possibility that the respondent population is skewed somewhat in the direction of higher participation.

Using Boshier's criterion, dropout was found to be 12% This compares favorably with the general extension rate of 23% but less favorably when viewed beside the early study-research group rate of 5%.

Bagnall (1975) observes that the normal dropout rate in science courses is considerably higher than that in the other extension courses. This is supported by Dickinson & Verner, who found a dropout rate of 39% in academic courses. Using their criterion, the rate in this study would be 32% The figure obtained using Boshier's criterion identifies much more closely, than does this last one, with the number of persons who actually had dropped out, in that they were no longer attending occasionally and making an effort to
find out what happened at the meetings which they missed.

Of those who missed one or more meetings (94% of participants), the following reasons for absence were noted (percentages being respondents who identified the reason for one or more absences): away from the district (30%), illness (28%), other commitments (70%), and miscellaneous (20%). Eighteen percent of respondents indicated that they had stopped attending before the course terminated, and an additional eight percent indicated declining attendance with progression of the course. The remainder missed only occasional meetings.

In that the mean daily attendance figure exceeded 55%, and that dropout, using Boshier's criterion, was less than 20%, hypothesis 2b is confirmed. However, the attendance and dropout statistics do not compare favorably with those of earlier study-research groups.

The general conclusion of this section is that, in confirmation of the general hypothesis, the technique does conform to those principles of adult education which were identified from the literature and addressed in the questionnaire.
IV. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PARTICIPANT BACKGROUND

The general hypothesis for this section is that the technique could provide, simultaneously in one class, meaningful educational experiences for individuals of widely varying pre-entry educational, biological, and socio-economic backgrounds.

The hypothesis demands that each of the classes (study-research groups) include a range of participant characteristics on each of the independent variables. Table 15 gives the chi square values and probabilities of deviation from random distribution of each independent variable in relation to membership of the six classes.

TABLE 15 — Chi square values and probabilities of participant-characteristic variables in relation to group membership. Asterisk indicates significant deviation from random.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>$\chi^2$</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) age</td>
<td>18.85</td>
<td>0.53</td>
</tr>
<tr>
<td>b) sex</td>
<td>8.50</td>
<td>0.13</td>
</tr>
<tr>
<td>c) socio-economic status</td>
<td>33.66</td>
<td>0.03</td>
</tr>
<tr>
<td>d) background in research</td>
<td>15.48</td>
<td>0.01*</td>
</tr>
<tr>
<td>e) previous formal non-credit study in the discipline of the group</td>
<td>37.71</td>
<td>0.00*</td>
</tr>
<tr>
<td>f) previous formal credit study in the discipline of the group</td>
<td>22.12</td>
<td>0.63</td>
</tr>
<tr>
<td>g) number of adult education courses previously taken</td>
<td>14.84</td>
<td>0.46</td>
</tr>
<tr>
<td>h) highest level of certificated attainment</td>
<td>45.25</td>
<td>0.11</td>
</tr>
<tr>
<td>i) type of adult education institution previously attended</td>
<td>23.32</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Two of the variables (background in research and previous formal non-credit study in the discipline of the group) show disparate distributions. These are detailed in Tables 16 and 17.

The distribution of participants with and without research backgrounds (Table 16) is not seriously clustered, in that only one group
(ornithology) comprised individuals who were all in one class. The other
groups showed a reasonable number in both classes. However, the distribution
of persons having previously studied in the discipline of the group through
adult education (Table 17) was less satisfactory. Undoubtedly reflecting the
local availability of such courses, only two groups (botany and geology)
had members in all classes and only one other group (ornithology) had members
in two of the three classes. This strongly skewed distribution will consid­
erably weaken any conclusion drawn on hypothesis 3e (that there is no
significant correlation between previous formal non-credit study in the
discipline of the study-research group and the learning evaluation and
response scores), but need not weaken conclusions based on that specific
hypothesis in isolation.

TABLE 16 — Horizontal percentage of group membership in relation to
research background.

<table>
<thead>
<tr>
<th>Group</th>
<th>No research Background</th>
<th>Research Background</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>history</td>
<td>75</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>geology</td>
<td>73</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>botany</td>
<td>38</td>
<td>62</td>
<td>13</td>
</tr>
<tr>
<td>freshwater biology</td>
<td>25</td>
<td>75</td>
<td>12</td>
</tr>
<tr>
<td>ornithology</td>
<td>100</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>mammalogy</td>
<td>36</td>
<td>64</td>
<td>11</td>
</tr>
<tr>
<td>total</td>
<td>58</td>
<td>42</td>
<td>65</td>
</tr>
</tbody>
</table>

To test the specific hypotheses 3a-3i (that is, those requiring, for
confirmation, no significant correlation between scoring on a participant
background item and the learning evaluation and response scores) the
correlation coefficients were determined for each of the participant
characteristics, listed in Table 15, in relation to the following evaluation
and response variables:
<table>
<thead>
<tr>
<th>Group</th>
<th>No Courses</th>
<th>One Course</th>
<th>Two Or More Courses</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>history</td>
<td>100</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>geology</td>
<td>20</td>
<td>20</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>botany</td>
<td>54</td>
<td>15</td>
<td>31</td>
<td>13</td>
</tr>
<tr>
<td>freshwater biology</td>
<td>100</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>ornithology</td>
<td>67</td>
<td>33</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>mammalogy</td>
<td>100</td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>total</td>
<td>74</td>
<td>11</td>
<td>15</td>
<td>65</td>
</tr>
</tbody>
</table>

1. learning outcome; integration of information and research;  
2. learning outcome; the subject as a research field;  
3. learning outcome; critical research ability;  
4. learning outcome; critical attitude;  
5. adult education principle; ensure high motivation to learning;  
6. adult education principle; allow for individual pace and level of learning;  
7. adult education principle; provide for practice with reinforcement of correct behavior;  
8. adult education principle; utilize group influences on learning;  
9. adult education principle; ensure relevance of the material to the learner;  
10. adult education principle; ensure meaningfulness of the material to the learner;  
11. adult education principle; enable individuals to utilize previous learning;  
12. adult education principle; facilitate learner self-evaluation;  
13. adequacy of the course introductory sessions;  
14. adequacy of the course reading materials;
15. increased ability to continue study independently;
16. encouraged to seek further courses in the subject of the group;
17. encouraged to seek courses in other subjects.

The correlation coefficients are shown in Table 18. None of the correlations has a statistically highly significant probability (p = 0.01). However, by raising the tolerance level to p = 0.05 the following significant correlations emerge:

A) previous formal non-credit study in the discipline of the group and:
   - adult education principle; utilize group influences on learning (0.49);
   - adult education principle; ensure relevance of the material to the learner (0.41);
   - adult education principle; facilitate learner self-evaluation (0.58);
   - encouraged to seek further courses in the subject of the group (0.57);

B) type of adult education institution previously attended and:
   - learning outcome; integration of information and research (0.38);
   - adult education principle; facilitate learner self-evaluation (0.37).

These correlations suggest that there may be some positive association between previous formal non-credit study in the discipline of the group and the degree to which a learner identifies with the problem and process. There may also be a positive association between the type of adult education institution previously attended (in relation to university extension) and the degree to which the learner is able to cope with the learning. This latter may be a function of the former.

Confirmation of the final specific hypothesis in this section demands that respondent evaluation of background adequacy, between those participants with, and those without a background in research, does not differ by more than 25% in any one category.

Of those respondents who lacked a research background, 39 percent
TABLE 18 — Correlation coefficients between participant-characteristic variables (a-i) and the learning evaluation and response variables (1-17). Double asterisk indicates a highly significant probability of correlation (p = 0.01). Single asterisk indicates significance (p = 0.05).

<table>
<thead>
<tr>
<th>a) age</th>
<th>b) sex</th>
<th>c) socio-econ. status</th>
<th>d) research background</th>
<th>e) non-credit ed., discipline</th>
<th>f) credit ed., discipline</th>
<th>g) no. ad. ed. courses</th>
<th>h) highest ac. qual.</th>
<th>i) prev. ad. ed. institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. integration of information &amp; research</td>
<td>-0.12</td>
<td>0.34</td>
<td>-0.08</td>
<td>0.22</td>
<td>0.22</td>
<td>-0.02</td>
<td>-0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td>2. the subject as a research field</td>
<td>-0.12</td>
<td>0.09</td>
<td>0.14</td>
<td>0.12</td>
<td>0.32</td>
<td>-0.18</td>
<td>0.07</td>
<td>-0.14</td>
</tr>
<tr>
<td>3. critical research ability</td>
<td>-0.21</td>
<td>0.17</td>
<td>0.33</td>
<td>0.10</td>
<td>0.23</td>
<td>-0.05</td>
<td>-0.02</td>
<td>-0.19</td>
</tr>
<tr>
<td>4. critical attitude</td>
<td>-0.05</td>
<td>0.19</td>
<td>-0.01</td>
<td>0.13</td>
<td>0.39</td>
<td>-0.14</td>
<td>-0.07</td>
<td>-0.05</td>
</tr>
<tr>
<td>5. ensure high motivation</td>
<td>0.10</td>
<td>0.04</td>
<td>0.22</td>
<td>0.08</td>
<td>0.35</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.16</td>
</tr>
<tr>
<td>6. individual pace and level</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.04</td>
<td>0.00</td>
<td>0.10</td>
<td>0.20</td>
<td>-0.19</td>
<td>0.05</td>
</tr>
<tr>
<td>7. practice with reinforcement</td>
<td>-0.19</td>
<td>0.10</td>
<td>-0.05</td>
<td>0.22</td>
<td>0.29</td>
<td>0.05</td>
<td>0.30</td>
<td>-0.01</td>
</tr>
<tr>
<td>8. utilize group influences</td>
<td>0.06</td>
<td>0.19</td>
<td>-0.13</td>
<td>0.12</td>
<td>0.49*</td>
<td>0.13</td>
<td>-0.13</td>
<td>-0.13</td>
</tr>
<tr>
<td>9. relevance of material</td>
<td>-0.09</td>
<td>0.13</td>
<td>-0.15</td>
<td>0.10</td>
<td>0.41*</td>
<td>0.36</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>10. meaningfulness of material</td>
<td>-0.14</td>
<td>0.04</td>
<td>-0.09</td>
<td>0.08</td>
<td>0.18</td>
<td>0.00</td>
<td>0.08</td>
<td>-0.21</td>
</tr>
<tr>
<td>11. utilize previous learning</td>
<td>-0.08</td>
<td>0.16</td>
<td>-0.07</td>
<td>0.05</td>
<td>0.18</td>
<td>0.34</td>
<td>-0.17</td>
<td>-0.10</td>
</tr>
<tr>
<td>12. facilitate learner self-evaluation</td>
<td>-0.11</td>
<td>0.04</td>
<td>0.11</td>
<td>0.04</td>
<td>0.38*</td>
<td>0.08</td>
<td>-0.14</td>
<td>-0.05</td>
</tr>
<tr>
<td>13. adequacy, course introduction</td>
<td>0.23</td>
<td>0.19</td>
<td>0.10</td>
<td>0.21</td>
<td>0.04</td>
<td>-0.14</td>
<td>0.01</td>
<td>-0.19</td>
</tr>
<tr>
<td>14. adequacy, course reading</td>
<td>0.06</td>
<td>0.10</td>
<td>0.07</td>
<td>0.25</td>
<td>0.13</td>
<td>0.00</td>
<td>-0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td>15. independent study, increased ability</td>
<td>0.12</td>
<td>0.05</td>
<td>-0.34</td>
<td>0.08</td>
<td>0.04</td>
<td>-0.14</td>
<td>-0.12</td>
<td>0.30</td>
</tr>
<tr>
<td>16. more courses in subject</td>
<td>-0.06</td>
<td>0.12</td>
<td>-0.23</td>
<td>0.14</td>
<td>0.57*</td>
<td>-0.28</td>
<td>-0.15</td>
<td>-0.11</td>
</tr>
<tr>
<td>17. more courses, other subjects</td>
<td>-0.12</td>
<td>0.12</td>
<td>0.30</td>
<td>0.10</td>
<td>0.04</td>
<td>-0.18</td>
<td>-0.09</td>
<td>-0.18</td>
</tr>
</tbody>
</table>
indicated that the lack was a hindrance to their participation. Of those possessing a research background, only 6 percent stated that it was too superficial. The difference between these figures is probably exaggerated by virtue of the first scale being only two point (hindrance/no hindrance) and the second scale being three-point (superficial/adequate/too detailed). Seventy-eight percent of the participants scored in the middle category on the second item which, if divided equally, would eliminate the difference in scoring between the items. Because of this error in instrument design the result must remain inconclusive.

The general hypothesis for this section (that the technique could provide, simultaneously in one class, meaningful educational experiences for individuals of widely varying pre-entry educational, biological, and socio-economic backgrounds) is thus generally confirmed. Some reservations, however, must be held in relation to the ability of participants who have not previously studied the subject through university extension or W.E.A. programs to identify fully with all aspects of the work. Also, for some participants, the lack of a research background was regarded as a hindrance to their full participation.

The final specific hypothesis called for a comparison between those participants with and those without an educational or occupational background in research; the point of comparison being the respondents' evaluation of the adequacy of their background. Due to an error in design of the questionnaire, this hypothesis could not be confirmed or rejected, although the responses pointed toward disconfirmation.
V. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO COURSE-ENTRY MOTIVATIONS

The general hypothesis for this section is that the technique can satisfy a wide range of course-entry motivations. Specifically, the criterion of acceptance is that the correlations between important course-entry motivational scores and satisfaction of the associated expectations are either weak or positive.

Table 19 gives the course-entry motivational items and the extent to which the scoring of each was correlated with satisfaction of the associated expectation.

In that there are no significant or highly significant negative correlations between motivational expectations and satisfaction, the hypothesis is confirmed. However, there is a suggestion in the results that the appeal of being involved with a research project was not as well satisfied for those who scored the item highly (correlation coefficient = -0.35). Also, those who were drawn particularly by a group leader may have been somewhat disappointed (correlation coefficient = -0.36). The one highly significant positive correlation—satisfaction with the subject-orientation motivational item (no. 15)—suggests a fairly unchanging attitude to this factor as a result of the course. Other items either were invalid for comparative purposes or else showed very weak correlations.
TABLE 19—Course-entry motivational items and correlation coefficients with satisfaction of the expectations. Double asterisk indicates a highly significant probability of correlation (p = 0.01); single asterisk indicates significance (p = 0.05); n.a. indicates insufficient data for valid comparison.

<table>
<thead>
<tr>
<th>Course-Entry Motivational Item</th>
<th>N</th>
<th>Corr. With Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. the thought of working with other similarly interested persons</td>
<td>29</td>
<td>-0.19</td>
</tr>
<tr>
<td>2. it might help to use up spare time</td>
<td>2</td>
<td>n.a.</td>
</tr>
<tr>
<td>3. it could be a good way to learn about the subject</td>
<td>43</td>
<td>0.04</td>
</tr>
<tr>
<td>4. I enjoy working outside</td>
<td>34</td>
<td>0.03</td>
</tr>
<tr>
<td>5. it would give me an opportunity to get away from home</td>
<td>3</td>
<td>n.a.</td>
</tr>
<tr>
<td>6. it might start me on a new hobby</td>
<td>4</td>
<td>n.a.</td>
</tr>
<tr>
<td>7. it could be a good preliminary to other related work</td>
<td>19</td>
<td>-0.02</td>
</tr>
<tr>
<td>8. it might let me out of some domestic chores</td>
<td>-</td>
<td>n.a.</td>
</tr>
<tr>
<td>9. a friend was also participating</td>
<td>3</td>
<td>n.a.</td>
</tr>
<tr>
<td>10. I liked the idea of being involved with a research project and its publication</td>
<td>27</td>
<td>-0.35</td>
</tr>
<tr>
<td>11. to work with a particular group leader</td>
<td>16</td>
<td>-0.36</td>
</tr>
<tr>
<td>12. the project work WAS related to my occupation</td>
<td>19</td>
<td>0.15</td>
</tr>
<tr>
<td>13. the project work was NOT related to my occupation</td>
<td>13</td>
<td>0.15</td>
</tr>
<tr>
<td>14. I am interested in the geographical area</td>
<td>32</td>
<td>0.03</td>
</tr>
<tr>
<td>15. I am interested in the subject of my study-research group</td>
<td>38</td>
<td>0.50**</td>
</tr>
<tr>
<td>16. I am interested in the recreational-planning aspect of the project</td>
<td>34</td>
<td>0.17</td>
</tr>
<tr>
<td>17. other (not specified in the questionnaire)</td>
<td>8</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
VI. MOTIVATIONAL FACTORS

Seven orthogonal factors with eigenvalues greater than one were obtained from the analysis. After rotation they accounted for 1.7, 1.6, 1.5, 1.5, 1.4, 1.4 and 1.3 percent of the variance respectively. The factors are shown in Table 20. Each item was included in one of the factors.

Factor 1 (activity need) comprises: an orientation to outside work (0.791), and a participating friend (0.758). However, the latter item is of minor importance as it was rated above zero by only three respondents. 'Unrelated to occupation' (0.334) loads on this factor, and 'preliminary to other related work' (-0.130) loads negatively. The factor thus is identifiable with Houle's activity orientation and perhaps more specifically with Sheffield's activity need (factor 10, Table 7).

Individuals who score highly on this factor are attracted by field activity and, in some cases, by the participation of a friend or relative. The unrelatedness of the activity to their normal occupations also tends to be an attraction. Conversely, low scores are not attracted by the outdoor nature of the activity, in which case the participation of a friend or relative is of minor importance. Low scores also tend to view the activity as a preliminary to other related work.

Factor 2 (cognitive interest) comprises three items: to initiate a new hobby (0.733), to learn about the subject (0.657), and, negatively, to work with others having similar interests (-0.560). The first item is of lesser importance than the others since it was rated above zero by only four respondents. 'Unrelated to occupation' loads positively (0.311), while the three items: recreational-planning aspect of the project (-0.271), use up spare time (-0.262), and participating friend (-0.146) load negatively. The factor is thus identifiable with the cognitive interest factor (number 12, Table 7).
<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Factor Name</th>
<th>Item Number</th>
<th>Abbreviated Item Name</th>
<th>Varimax Factor Loading</th>
<th>Variance Accounted for by Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>activity need</td>
<td>4</td>
<td>working outside participating friend</td>
<td>0.791</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td>0.758</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>cognitive interest</td>
<td>6</td>
<td>initiate a new hobby</td>
<td>0.733</td>
<td>1.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>learn about the subject</td>
<td>0.657</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>work with others of similar interests</td>
<td>-0.560</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>professional goal</td>
<td>12</td>
<td>related to occupation</td>
<td>0.644</td>
<td>1.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>involvement with research and publication</td>
<td>-0.621</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>preliminary to other related work</td>
<td>0.580</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>personal goal</td>
<td>17</td>
<td>other items listed by respondents</td>
<td>0.761</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>recreational-planning aspect of project</td>
<td>0.682</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>unrelated to occupation</td>
<td>0.415</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>local area interest</td>
<td>14</td>
<td>geographical area</td>
<td>0.807</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>work with a particular leader</td>
<td>0.430</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>secondary activity</td>
<td>2</td>
<td>use up spare time</td>
<td>0.690</td>
<td>1.37</td>
</tr>
<tr>
<td>7</td>
<td>escape/stimulation</td>
<td>5</td>
<td>to get away from home</td>
<td>0.732</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>subject of the group</td>
<td>-0.722</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 20 — Motivational factors identified from the seventeen items.
Individuals who score highly on this factor are attracted by the desire to learn in the subject area of the study and also, in some cases, by a desire to start a new hobby in the field of the study. Interestingly, they are not inclined to be attracted by the thought of working with others having similar interests. They tend to take the study seriously, in that it is not used as a fill-in for spare time, but the study tends to be unrelated to their normal occupations. The converse applies to low scorers who are not or only weakly attracted by the desire to learn, are not inclined to be motivated by the thought of starting a new hobby but are likely to be attracted to work with others of similar interests and by the relatedness of the work to their normal occupations.

Factor 3 (professional goal) comprises the items: related to occupation (0.644), preliminary to other related work (0.580) and, negatively, involvement with research and publication (-0.621). There are also weaker negative loadings of: to get away from home (-0.177), and working outside (-0.126). The factor thus is identifiable as the professional goal factor (number 2, Table 7).

Individuals who score highly on this factor are attracted by a perceived relatedness of the study to their occupations. They see participation as a preliminary to other similar work, and are not attracted by the pure satisfaction of being involved in a research project and its publication. A desire to get away from home and to work outside tend not to be issues. Low scorers, on the other hand, are not strongly attracted by a perceived relatedness of the study to their occupations, and they do not see participation as being an important preliminary to other similar work. They are, however, likely to be attracted by the research nature of the project and, to a lesser extent, by the desire to get out-of-doors and away from home.
Factor 4 (personal goal) comprises: additional items noted by the respondents (0.761), the recreational-planning aspect of the project (0.682), and motivation unrelated to occupation (0.415). The first item was scored above zero by only eight persons who noted a variety of motivations relating to personal objectives. A number of other items load somewhat negatively on this factor, especially: working outside (-0.210), to initiate a new hobby (-0.174), involvement with research and publication (-0.166), and to work with a particular leader (-0.195). The factor thus may be identified tentatively with the personal goal factor (number 1, Table 7).

Individuals who score highly on this factor are motivated by one or more of a variety of personal goals; for example: to increase their research ability, to increase their facility in identifying members of some group of organisms, to improve their ability as instructors in field-study work, or to be influential in the making of decisions regarding future use of the land being surveyed. Such motivations are generally not associated with an attraction to the course on the basis of its perceived relatedness to the participant's normal occupation. A desire to work outside, to initiate a new hobby in the area of study, and to work with a particular group leader tend to be of little or no importance, as does the attraction of research involvement per se. Low scores are unlikely to be motivated strongly by identified personal goals, but are attracted by the relatedness of the study to their occupations.

Factor 5 (local area interest) comprises two items: attraction to the geographical area (0.807), and to working with a particular group leader (0.430). Most other items of any importance in the factor load negatively: to work with others of similar interests (-0.277), to learn about the subject (-0.187), to work outside (-0.271), to get away from home (-0.331), involvement with research and publication (-0.277), work related to occupation (-0.194), and the study-research group subject (-0.289). 'Participating
friend,' however, loads positively (0.317). The factor is thus difficult to identify, but suggests a desire to learn about the local area from an expert.

Individuals scoring highly on this factor are attracted by the thought of working in the particular geographical area of the study, and by a certain group leader with whom they wish to study. They also tend to be motivated by a participating friend or relative. However, working with others of similar interest, a desire to learn about the subject outside and away from home, involvement with research, and the relatedness of the study subject to their normal occupations all tend to be of small importance to such persons. Conversely, low scorers are not inclined to be attracted by the geographical area, a particular group leader, or a participating friend or relative. They are, however, more likely to be motivated by a desire to learn about the subject of their group, in an outside setting, away from home; they tend to view the work as more closely related to their occupations, and are likely to be attracted by involvement with research.

In factor 6 (secondary activity) only one item loads predominantly — to use up spare time (0.690) — and this was scored above zero by only two respondents. Work with others of similar interests (-0.476) loads negatively, as does preliminary to other related work (-0.578). There are smaller positive loadings by related to occupation (0.272), and the recreational-planning aspect of the project (0.322). The factor thus is tentatively identified as a secondary activity one.

Individuals who score highly on this factor are not strongly attracted by others with similar interests, but may be motivated to participate in order to fill-in time. The study is unlikely to be undertaken as a preliminary to other similar work, but it may be taken for its association with the participant's occupation, and because of an attraction to the recreational-planning aspect of the work. The opposite motivations apply to low scorers.

Factor 7 (escape/stimulation) comprises two items: to get away from
home (0.732) and negatively, the subject of the group (-0.722). It is identifiable with the escape/stimulation factor (number 7, Table 7).

High scorers on this factor are attracted to participation by a desire to escape from the home environment. Other researchers who have identified this factor, include in it escape from a variety of unpleasantnesses and, conversely, attraction to some form of stimulation. Due to the limited range of items in the present survey instrument, however, it is not possible to take such a broad view of the factor. High scorers are not attracted strongly by the subject matter of the study — this being consistent with motivations of escape/stimulation motivated persons. Low scorers, on the other hand, are only weakly, or not at all, motivated by a desire to escape the home, but they are attracted by the subject matter of their study-research group.

Of the seven factors identified as important in the conceptual basis to this evaluation, four are detectable here: personal goal, professional goal, escape/stimulation, and cognitive interest. Of the others: 'social welfare' could not be expected since there were no items relating to it; similarly, there were no items specifically relating to 'external expectations,' and any such motivation would be included in the professional goal factor; and 'social contact' did not emerge from the limited number of items as being separate from 'activity need.'

The specific hypothesis for this section was that a factor analysis of the course entry motivational items would reveal factors similar to those identified in other studies in so far as appropriate items were included in the instrument. The results generally confirm the hypothesis. However, the limited number of items and the specific application of some of them to the particular project studied do not permit the drawing of firmly generalizable conclusions.
VII. PARTICIPATIONAL FACTORS

The general hypothesis is that meaningful participational factors can be identified and related to the motivational factors; and together form a basis for the identification of participants in each study-research group. The testing of this hypothesis is best covered in three sections, each relating to one of the specific hypotheses.

Identification of Factors

The first specific hypothesis is that meaningful participational factors exist among the items pertaining to: educational background, socio-economic status, personal attributes, evaluation of the technique, and preferred structuring of such programs.

Eleven factors having eigenvalues greater than one were obtained from the first analysis and were obliquely rotated. After the rotation the total variance accounted for by each factor was: factors 1(3.4), 2(2.9), 3(2.6), 4(2.2), 5(2.2), 6(1.9), 7(1.7), 8(1.7), 9(1.4), 10(1.4), and 11(1.3).

The second factoring orthogonally rotated eight factors to permit comparison with the motivational factors. Only one item, preferred group size, did not load significantly on any factor, and was thus eliminated. After rotation the variance accounted for by each factor was: factor 1(6.9), 2(2.9), 3(2.6), 4(2.5), 5(2.4), 6(2.3), 7(1.9), and 8(1.8). The factors identified are shown in Table 21. The factor characteristics noted in the table were supported by the loadings of less important items.

Individuals scoring highly on factor 1 (identification with the project process) rate the technique highly as a means of realizing the identified principles of good adult education. Conversely, low scorers do not consider that the technique is generally suitable for full expression of those principles.
TABLE 21(a) — Participational factors identified with orthogonal rotation. Asterisk indicates item loading more heavily on another factor (factor given in parentheses).

<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Factor Characteristics</th>
<th>Item Number</th>
<th>Abbreviated Item Name</th>
<th>Varimax Factor Loading</th>
<th>Variance Acc. for by Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>identification with project process</td>
<td>43</td>
<td>value, research involvement</td>
<td>0.849</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>41</td>
<td>value, teaching research</td>
<td>0.842</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>36</td>
<td>value, uses group influences</td>
<td>0.808</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>42</td>
<td>value, learning attitudes</td>
<td>0.772</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>40</td>
<td>value, self-evaluation of learning</td>
<td>0.757</td>
<td>6.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35</td>
<td>value, maintains interest</td>
<td>0.754</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>39</td>
<td>value, practice with reinforcement</td>
<td>0.752</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>37</td>
<td>value, uses existing learning</td>
<td>0.722</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>44</td>
<td>value, individual pace and level</td>
<td>0.686</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>38</td>
<td>value, meaningful material</td>
<td>0.672</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>academic preparation</td>
<td>28</td>
<td>academic qualifications</td>
<td>0.866</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
<td>previous credit study in discipline</td>
<td>0.695</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23</td>
<td>status</td>
<td>-0.677</td>
<td>2.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24</td>
<td>research background</td>
<td>0.519</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>21</td>
<td>age</td>
<td>-0.435</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>previous adult education</td>
<td>29</td>
<td>previous adult education institutions</td>
<td>0.795</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>previous total adult education courses</td>
<td>0.773</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>brochure adequacy, subject</td>
<td>0.506</td>
<td>2.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22</td>
<td>sex</td>
<td>0.480</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>identification with educational aspects of the project</td>
<td>34</td>
<td>learning critical research abilities</td>
<td>0.649</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>33</td>
<td>learning research procedures</td>
<td>0.646</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>53</td>
<td>prefer scheduling by groups</td>
<td>0.608</td>
<td>2.49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48</td>
<td>increased ability, independent study</td>
<td>0.575</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 21(b) — Participational factors identified with orthogonal rotation. Asterisk indicates item loading more heavily on another factor (factor given in parentheses).

<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Factor Characteristics</th>
<th>Item Number</th>
<th>Abbreviated Item Name</th>
<th>Varimax Factor Loading</th>
<th>Variance Acc. for by Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>continuing education-centered subject interest</td>
<td>25 58 32 54 49</td>
<td>previous non-credit study would pay higher course fee brochure adequacy, time commitment preferred length of meetings increased motivation, courses in discipline preferred frequency of half-day meetings</td>
<td>0.753 0.686 -0.527 0.427 0.404 -0.411</td>
<td>2.42</td>
</tr>
<tr>
<td>6</td>
<td>increased adult education interest</td>
<td>47 31 50 56</td>
<td>adequacy, course reference material brochure adequacy, technique increased motivation, courses other disciplines preferred frequency of half-day meetings</td>
<td>0.695 0.543 0.496 -0.451</td>
<td>2.35</td>
</tr>
<tr>
<td>7</td>
<td>high participation</td>
<td>45 55</td>
<td>attendance preferred frequency, day-long meetings</td>
<td>0.597 0.579</td>
<td>1.85</td>
</tr>
<tr>
<td>8</td>
<td>identification with project activity</td>
<td>52 57 46</td>
<td>desire more intergroup contact preferred project duration adequacy, introductory material</td>
<td>-0.567 0.557 0.484</td>
<td>1.76</td>
</tr>
</tbody>
</table>
Participants with high scoring on factor 2 (academic preparation) are generally younger, and of high formal academic attainment and socio-economic status. They are most likely to have previous credit study in the discipline of their group and to have backgrounds in research. Low scorers, on the other hand, are older and of lower formal academic attainment and socio-economic status. They also are less likely to have backgrounds in research or to have previous credit study in the discipline of their group.

Factor 3 (previous adult education) identifies a dimension relating to previous adult education and associated variables. High scorers are more likely to be women and to have participated in previous adult education courses, particularly through university extension. Related to this, they are more satisfied with the brochure material concerning the course subject matter. Conversely, low scorers on this factor tend to be men who are less likely to have participated in any previous adult education courses, especially through university extension. They are also less satisfied with the brochure material relating to subject matter.

Participants scoring highly on factor 4 (identification with educational aspects of the project) show high satisfaction with the way in which the technique was used to develop their problem-solving intellectual skills and cognitive strategies. They record generally increased ability to study independently within the subject of their group, and show a preference for having course meetings scheduled by group discussion. Low scorers, on the other hand, tend to be unhappy with the technique as a means of learning problem-solving skills and cognitive strategies; their ability to study independently in the subject is unchanged by participation in the course, and they prefer prescheduled meeting times. In short, low scorers appear to require their education to be externally structured to a greater extent than was the case within this course.

Participants scoring highly on factor 5 (continuing education-centered...
subject interest) record greater previous commitment to involvement with adult education, and increased motivation to seek further courses, in the subject of their group, as a result of participation in the course. However, they find the brochure material, with regard to time commitment, to be inadequate. They also show a preference for full-day length, more widely spaced, meetings, and indicate a greater preparedness to pay high course fees. Low scorers tend to have little or no previous involvement with adult education, and are either discouraged or unmoved with regard to further study in the discipline of their group. They are happier with the brochure explanations of time commitment, but show a preference for shorter, more frequent, meetings in courses for which they will pay only a low fee.

Factor 6 (increased adult education interest) draws together a number of items associated with increased motivation to attend courses in other disciplines. High scorers tend to record an increased motivation to attend adult education courses in disciplines, other than that of their group, as a result of their participation. They are inclined to be happier, than are low scorers, with the course reference material and with the brochure in relation to descriptive information on the nature of the course technique. They do, however, tend to favor more widely spaced half-day meetings than do low scorers.

Participants scoring highly on factor 7 (high participation) have high mean attendance figures and indicate a preference for more frequent full-day meetings. Low scorers have poorer attendance figures and, understandably, they opt for more widely spaced meetings.

High scorers on factor 8 (identification with project activity) tend to favor long projects — one or two years in duration — and feel that the project in which they participated suffered from too little interchange among the study-research groups. Related to these items, such participants also show satisfaction with the course introductory material. On
the other hand, low scorers tend to be happy with the lack of intergroup contact, and favor shorter projects, considering the course introductory material to have been inadequate.

General participational factors are thus identifiable, although the first factor selected from the orthogonal rotation may reflect a respondent tendency to score adjacent items similarly. Nevertheless, the factors reveal some interesting identifiable orientations to the project, and thus confirm the specific hypothesis.

**Relationship Between Motivational and Participational Factors**

The second specific hypothesis is that the participational factors could be related meaningfully to the motivational factors.

To test this, correlation coefficients between the two sets of factors were prepared from the factor scores of each respondent on each orthogonal factor. The results are presented in Table 22. The coefficients are all uniformly low. However, the higher values among them are worth noting: 1) a positive correlation \((r = 0.37)\) between escape/stimulation and previous adult education; 2) a negative correlation \((r = -0.22)\) between activity need and academic preparation; 3) a positive correlation \((r = 0.20)\) between activity need and high participation; 4) a negative correlation \((r = -0.29)\) between secondary activity need and identification with the project process; 5) a negative correlation \((r = -0.25)\) between local area interest and academic preparation; 6) a positive correlation \((r = 0.23)\) between local area interest and increased adult education interest; 7) a negative correlation \((r = -0.21)\) between local area interest and identification with the project process; 8) a negative correlation \((r = -0.23)\) between local area interest and high participation; 9) negative correlations \((r = -0.23 \text{ in both})\) between personal goal and both continuing education-centered subject interest and increased adult education interest; and 10) a negative correlation \((r = -0.21)\) between
TABLE 22 — Correlation coefficients between factor loadings on the orthogonally rotated participational and motivational factors.

<table>
<thead>
<tr>
<th>Participational Factors</th>
<th>Motivational Factors</th>
<th>1. activity need</th>
<th>2. cognitive interest</th>
<th>3. professional goal</th>
<th>4. personal goal</th>
<th>5. local area interest</th>
<th>6. secondary activity</th>
<th>7. escape/stimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. identification with the project process</td>
<td></td>
<td>-0.01</td>
<td>-0.04</td>
<td>-0.21</td>
<td>0.12</td>
<td>-0.21</td>
<td>-0.29</td>
<td>0.00</td>
</tr>
<tr>
<td>2. academic preparation</td>
<td></td>
<td>-0.22</td>
<td>-0.10</td>
<td>0.18</td>
<td>-0.05</td>
<td>-0.25</td>
<td>0.11</td>
<td>-0.10</td>
</tr>
<tr>
<td>3. previous adult education</td>
<td></td>
<td>-0.06</td>
<td>0.04</td>
<td>-0.16</td>
<td>-0.06</td>
<td>0.09</td>
<td>-0.06</td>
<td>0.37</td>
</tr>
<tr>
<td>4. identification with educational aspects of project</td>
<td></td>
<td>-0.06</td>
<td>-0.02</td>
<td>-0.01</td>
<td>0.06</td>
<td>0.06</td>
<td>-0.11</td>
<td>-0.02</td>
</tr>
<tr>
<td>5. continuing education-centered subject interest</td>
<td></td>
<td>-0.16</td>
<td>0.09</td>
<td>-0.05</td>
<td>-0.23</td>
<td>-0.07</td>
<td>-0.11</td>
<td>-0.09</td>
</tr>
<tr>
<td>6. increased adult education interest</td>
<td></td>
<td>0.05</td>
<td>0.05</td>
<td>-0.09</td>
<td>-0.23</td>
<td>0.23</td>
<td>0.13</td>
<td>-0.05</td>
</tr>
<tr>
<td>7. high participation</td>
<td></td>
<td>0.20</td>
<td>0.09</td>
<td>-0.03</td>
<td>-0.13</td>
<td>-0.23</td>
<td>-0.12</td>
<td>-0.09</td>
</tr>
<tr>
<td>8. identification with project activity</td>
<td></td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.13</td>
<td>-0.12</td>
<td>-0.02</td>
<td>-0.09</td>
<td>-0.17</td>
</tr>
</tbody>
</table>
professional goal and identification with the project process.

From these correlations some possible associations can be identified very tentatively —

1) Participants scoring highly on the escape/stimulation motivational factor are more likely to be women and to have participated in previous adult education courses, particularly through university extension. They are also likely to be more satisfied with the brochure material concerning the course subject matter. The opposite tendencies apply to low scorers.

2) Participants scoring highly on the activity need motivational factor tend to be older and of lower formal academic attainment and socio-economic status. They are also less likely to have backgrounds in research or to have previous credit study in the discipline of their group. However, they do tend to have high mean attendance figures and to indicate a preference for more frequent full-day meetings.

3) High scorers on the secondary activity need motivational factor are more likely to rate the technique poorly as a means of realizing the identified principles of good adult education. Conversely, low scorers on this activity need factor tend to score highly the technique as being generally suitable for the full expression of the principles.

4) Participants scoring highly on the motivational factor 'local area interest' tend to be older and of lower formal academic attainment and socio-economic status. They are less likely to have backgrounds in research or to have previous credit study in the discipline of their group. However, they tend to record an increased motivation to attend courses in disciplines, other than that of their group, as a result of their participation. They are also inclined to be happier with the course reference material and with the brochure in relation to descriptive information on the nature of the course technique. They do not tend to score the technique highly as a means of realizing the identified principles of good adult education, and have
correspondingly low attendance figures; indicating, also, a preference for less frequent full-day meetings.

5) High scorers on the personal goal motivational factor tend to have little or no previous involvement with adult education, and are either discouraged or unmoved by participation with regard to further study within or beyond the discipline of their group. They are happier with the brochure explanation of time commitment, but not so with regard to the nature of the course technique. They show a preference for shorter, more frequent, meetings of study-research group courses, for which they will pay only a low fee.

6) Participants scoring highly on the professional goal motivational factor show a tendency to rate the technique poorly as a means of realizing the identified principles of adult education. Conversely, low scorers are more apt to feel that the technique is well suited to full expression of the principles.

In spite of the foregoing interesting trends in the data, none of the correlations is strong enough to support fully the hypothesis that meaningful relationships could be found between the two sets of factors.

Factors in the Identification of Group Membership

The third specific hypothesis is that the respondent factor scores on the motivational and participational factors could be used to provide a reasonable measure of identification for participants of each study-research group.

The participant scores on both participational and motivational factors were examined via stepwise discriminant analysis to determine if observable differences existed among any of the six study-research groups (geology, history, botany, freshwater biology, ornithology, and mammalogy). Three of these factors were significant discriminants. In order of discriminating power the factors were: 1) Increased Adult Education Interest, 2) Activity
Need, and 3) Identification with the Project Activity. The extent to which these three factors enabled one to distinguish one study-research group from another is shown in Table 23; 41.5% of the respondents could be classified correctly into their respective groups. The distribution of assigned cases is shown in Table 24, and the results using the Cooley and Lohnes procedure in Table 25.

**TABLE 23 — Differentiability among six study-research groups. Probabilities are given in parentheses.**

<table>
<thead>
<tr>
<th>Group</th>
<th>History</th>
<th>Geology</th>
<th>Botany</th>
<th>Freshwater Biology</th>
<th>Ornithology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology</td>
<td>6.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00069)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botany</td>
<td>4.40</td>
<td>1.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00755)</td>
<td>(0.23023)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshwater Biology</td>
<td>3.20</td>
<td>10.64</td>
<td>4.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.02948)</td>
<td>(0.00002)</td>
<td>(0.00839)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ornithology</td>
<td>2.27</td>
<td>3.78</td>
<td>2.90</td>
<td>4.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.08905)</td>
<td>(0.01511)</td>
<td>(0.04217)</td>
<td>(0.00430)</td>
<td></td>
</tr>
<tr>
<td>Mammalogy</td>
<td>4.17</td>
<td>14.83</td>
<td>7.50</td>
<td>0.79</td>
<td>7.94</td>
</tr>
<tr>
<td></td>
<td>(0.00982)</td>
<td>(0.00000)</td>
<td>(0.00030)</td>
<td>(0.50697)</td>
<td>(0.00020)</td>
</tr>
</tbody>
</table>

Using either procedure for developing the variables, some groups show higher participant differentiability than others. Geology, freshwater biology and mammalogy participants were quite highly differentiable, whereas the history and ornithology participants were poorly so. The clustering of botany and geology participants is interesting, since these two subject areas have been more strongly represented in adult education programs of previous years than have the other subjects. The freshwater biology participants also tend to cluster with the botanists, which could be related to the fact that the botany group was fully enrolled before the freshwater biology, and applicants for the former group generally gave freshwater biology as their second choice.
TABLE 24 — Classification of participants into study-research groups, based on canonical variables developed in the stepwise discriminant analysis. Those cases underlined were correctly assigned. Rows represent the actual membership of each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>History</th>
<th>Geology</th>
<th>Botany</th>
<th>Freshwater Biology</th>
<th>Ornithology</th>
<th>Mammalogy</th>
<th>Total</th>
<th>% Classified Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Geology</td>
<td>1</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>73</td>
</tr>
<tr>
<td>Botany</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>F'w. Biol.</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>Ornithology</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Mammalogy</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>11</td>
<td>55</td>
</tr>
</tbody>
</table>

TABLE 25 — Classification of participants into study-research groups using Cooley and Lohnes centroids. Those cases underlined were correctly assigned. Rows represent the actual membership of each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>History</th>
<th>Geology</th>
<th>Botany</th>
<th>Freshwater Biology</th>
<th>Ornithology</th>
<th>Mammalogy</th>
<th>Total</th>
<th>% Classified Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Geology</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Botany</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>F'w. Biol.</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>Ornithology</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Mammalogy</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>7</td>
<td>11</td>
<td>64</td>
</tr>
</tbody>
</table>
In conclusion, the overall correct classification of the participants on the basis of the factor scores is reasonably high. The specific hypothesis is confirmed.

Summary

The general hypothesis — that meaningful participational factors could be identified and related to the motivational factors; and together form a basis for the identification of participants in each group — was only partially confirmed.

The first specific hypothesis was confirmed with the identification of participational factors. The second was not, since no significant correlations could be found between the sets of factors. The motivational and participational factor sets appear, rather, to be complementary, which is supported by the entry of factors from both sets into the stepwise discriminant analysis. The third specific hypothesis was confirmed with this last analysis and the subsequent correct classification of 41.5 percent of the respondents into their respective study-research groups.
The general hypothesis for this section is that participants express general satisfaction with the program design and publicity, in that the type of structure preferred is closely similar to that of the program studied. The testing of such an hypothesis is best covered in eight sections, each relating to one of the specific hypotheses.

Course Reading Material

The specific hypothesis is that the majority of respondents prefer course reading material to be a mixture of hand-out papers and references given. The distribution of preferences expressed by participants is: only hand-out material (11%), references only provided (15%), and a mixture of the two (74%). Evidently, by providing a mixture in future courses, most participants would be well satisfied. The specific hypothesis is thus confirmed.

Group Size

The specific hypothesis is that not more than 12% of the respondents prefer a mean group size outside the range of 10-20 persons.

The distribution of respondent preferences is as follows: 11 persons (9% of respondents), 12 persons (20%), 13 persons (20%), 15 persons (20%), 20 persons (24%), and 30 persons (7%). Thus, only seven percent of the respondents recorded a mean preference outside the range of 10-20 members. The average is sixteen participants, which equates very closely with the stated maximum of fifteen for the program. The range of numbers nominated (11-30) suggests, surprisingly, that the respondents may be unhappy with very small groups.

The specific hypothesis is thus confirmed.
Intergroup Contact

The specific hypothesis is that not more than 25% of the respondents indicate dissatisfaction with the lack of intergroup contact during the course.

Responses to the questionnaire show that 73 percent of participants were not satisfied with the lack of intergroup contact during the year.

The specific hypothesis is thus refuted. Failure to provide for meaningful exchange between study-research groups was clearly a shortcoming of the project.

Scheduling of Meetings

The specific hypothesis is that not more than 25% of the respondents prefer prescheduling of meetings to scheduling by the group.

Study-research group meetings were scheduled in five of the six groups by agreement among the participants. Eighty percent of the respondents favored this rather than conforming to prescheduled meetings. The hypothesis is thus confirmed.

Length of Meetings

The specific hypothesis is that not more than 25% of the respondents prefer half-day length meetings to full-day meetings.

Fifty-seven percent of respondents indicated a preference for day-long meetings, 32 percent for half-day meetings, eight percent were undecided between these two, and only three percent preferred a block course of about ten consecutive days. Most of the project meetings were a full-day in length, with the remainder a half-day. There seems to be a desire for a somewhat greater proportion of half-day meetings than was the case; the hypothesis being refuted.
Length of Course

The specific hypothesis is that not more than 25% of the respondents consider the course to have been too long.

The project was limited to one calendar year. Nineteen percent of respondents considered this to be too long, preferring a half year. Forty-two percent preferred a full year. But, most interestingly, 39 percent indicated a preference for a two-year program. The hypothesis is thus confirmed.

Structuring of the Course

The specific hypothesis is that not more than 12% of the respondents express the desire for more formal instruction, a formal prerequisite course, or for better structuring of the program.

At selected points in the questionnaire participants were asked to make recommendations on programming and instructional features which would have increased their satisfaction and involvement with the course. Most of the responses were so scattered as to be of no overall importance. However, there were a number of clusters, which are summarized in Table 26. The calls for more formal instruction and a formal introductory course suggest that these participants were not fully able to identify with the study-research group technique and to cope with the material. This well may have arisen from inadequate pre-course preparation of the group leaders. The suggestions on better structuring of the course referred to such items as frequent lack of direction or understanding of how their work fitted into the research aims of the project as a whole. The respondents who recorded dissatisfaction with meeting arrangements all came from the one group in which there was evidently some poor management of this factor. The call for more participant involvement/aspects of the project is a serious reflection on the program since this is one of the theoretical foundations of the method. It was evident
TABLE 26 — Recommendations for improvement of program and instructional processes.

<table>
<thead>
<tr>
<th>Nature of Recommendation</th>
<th>Recommendation</th>
<th>% Respondents in Class</th>
<th>% all Respondents</th>
</tr>
</thead>
</table>
| 1. From respondents who felt that the course had met the educational objectives only poorly or reasonably—recommended structures for better meeting the objectives. | a. more formal instruction  
b. a formal prerequisite introductory course  
c. better structuring of the course | 13  
13  
31 | 8  
8  
18 |
| 2. Suggestions given for ways in which the group leaders could have improved attendance. | a. better understanding of meeting arrangements  
b. more participant involvement | 13  
3 | 12  
3 |
| 3. General suggestions for improvement of the course. | a. more participant involvement  
b. smaller-scale project or survey area | 15  
9 | 15  
9 |

TABLE 27 — Response to items regarding the adequacy of descriptive information in the pre-enrolment brochure.

<table>
<thead>
<tr>
<th>Descriptive Category</th>
<th>Evaluation (% in each class)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
</tr>
<tr>
<td>1. the nature of the subject matter</td>
<td>8</td>
</tr>
<tr>
<td>2. the course technique</td>
<td>23</td>
</tr>
<tr>
<td>3. the expected commitment of your time</td>
<td>16</td>
</tr>
</tbody>
</table>
from a study of the responses that in some groups too many decisions were made by the group leader without involving the group. The remainder of respondents in this category were unhappy at their not being involved in actually writing the publications resulting from the work.

In that over 12% of the respondents call for modification of the course on each of the items noted (formality of instruction, formal prerequisite course, and improved program structure), the specific hypothesis is refuted.

Adequacy of the Program Brochure

The specific hypothesis is that, with regard to: 1) the nature of the course subject matter, 2) the course technique, and 3) the expected time commitment, not more than 12% of the respondents score as poor the descriptive information in the program brochure.

Responses to the questionnaire items on adequacy of the brochure are summarized in Table 27. Eight percent of respondents rated the descriptive material on subject matter as poor; 23 percent rated as poor the material concerning course technique; and 16 percent that concerning the expected commitment of their time. Thus, the last two figures demand rejection of the hypothesis.

The fact that 16 percent of the enrollees were unaware of the time commitment expected of them, at the very least, would have an effect on attendance figures. A better effort seems to be required in presenting the technique although, hopefully, those entering the program with misconceptions would have been able to identify subsequently with the actual process.

Course Planning Guidelines

The preceding stated preferences on programming features can be used
as a general guide to the future planning of study-research group courses. However, it can be argued that, as such a guide, the stated preferences are limited by the respondent's past range of experiences in adult education. This is undoubtedly so, but it must also be appreciated that, regardless of just how limited an adult's outlook is, if he or she is unhappy with a publicised program structure, this is likely to act as a barrier to enrolment.

Three additional items, not used in the evaluation, may be of interest to programmers.

Firstly, the nominal $10.00 enrolment fee, made possible by grants from various sources, appears to have been potentially important in attracting participants. Eighty-nine percent of respondents indicated that they would not have enrolled had the course not been subsidized.

Secondly, the response to items relating to the preferred frequency of meetings. Assuming full-day meetings, 41 percent chose a fortnightly frequency, and 39 percent a monthly frequency. Assuming half-day meetings, a higher proportion (61%) chose a fortnightly frequency with 16 percent selecting monthly.

Thirdly, most of the meetings for courses such as this must, of necessity, be held on Saturday or Sunday. Traditionally, the sabbath has been avoided in university extension courses, but on this course a fairly equal distribution between Saturday and Sunday meetings was evident. The expressed preferences of participants reflect this, with 22 percent preferring Saturday, 17 percent Sunday, and 61 percent a mixture of both.

Conclusions

The general hypothesis is only partly confirmed, in that four of the specific hypotheses were rejected (those relating to: intergroup contact, length of meetings, structuring of the course, and adequacy of the program
These represent areas of incongruency between participant preferences and actual features of the program. Such incongruencies are likely to have had a negative influence on participant evaluations of the technique.
CHAPTER V

CONCLUSIONS

I. CHARACTERISTICS OF THE PARTICIPANTS

On two items the participant population was more representative of the Wellington urban population than that of the general university extension enrolment studied by Boshier (1969, 1971a). These were the relative numbers of men and women, which were almost equal, and the distribution of participant ages.

In contrast, the participants were disproportionately representative of the uppermost socio-economic class to an even greater degree than was the case in the general university extension enrolment. The distribution of participant highest academic qualification, predictably, follows the same general pattern. The better qualified, especially those with university degrees were a grossly over-represented segment of the population, while the unqualified were very weakly represented. These patterns are understandable in terms of the high involvement demanded of participants, which would tend to selectively favor persons high in self-confidence and intrapersonal competence, and favoring the higher-achievement social groups.

Encouragingly, just over half of the respondents had not previously studied through credit courses in the discipline of their study-research group, and nearly 70 percent had not done so through non-credit adult education programs. Also, a quarter of the participants had not taken part previously in any adult education programs, but of those who had done so, most had studied one or more courses organized through university extension.

The participants thus represented a socio-economic and educational elite, reasonably representative of the local age and sex distribution,
and with an encouraging number who had not participated previously in adult education or studied the subject with which they were involved in the program.

II. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO THE LEARNING OF RESEARCH-BASED CONTENT

Emphasis in the instruction and its evaluation was placed on those learning outcomes identified as important to a critical and practicable understanding of research. These were identified as an appropriately critical attitude, and higher-order intellectual skills and cognitive strategies associated with problem-solving.

Within the limitations of the type of evaluation instrument used, the technique appears to be well suited to the achievement of these outcomes.

III. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PRINCIPLES OF ADULT EDUCATION

A number of the principles of adult education identified in the conceptual study were regarded as so fundamental to the technique that they were not included in the evaluation instrument. Others were excluded because they related to individual instructor performance rather than to any characteristics of the technique.

All of the principles actually evaluated through the questionnaire received encouragingly high ratings with one exception — the facilitation of learner self-evaluation — for which one third of the respondents indicated doubt as to the suitability of the technique for its realization.

The results of this section, however, should be regarded with caution. The high inter-item correlations, expressed in both the factor
analysis and the individual item correlation coefficients, indicate that participant response to these items was rather uniform (probably a 'halo' effect).

The statistics on average attendance and dropout revealed a reasonably high involvement with, and interest in, the course. This is particularly so when one considers the total time commitment involved and the fact that a number of respondents indicated a failure of the pre-enrolment publicity to communicate the true extent of that involvement.

IV. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO PARTICIPANT BACKGROUND

In spite of the unrepresentative nature of the participant population, most of the groups included an acceptable range of participant biological, educational and socio-economic backgrounds.

Nine participant background variables were tested for correlation with seventeen learning evaluation and response variables. In that no highly significant correlations emerged it could be concluded that the technique is able to provide, simultaneously in one class, meaningful educational experiences for individuals of widely varying background. However, there were indications that participants who had previously studied in the discipline of their group, through university extension or the Workers Education Association, were better able than others to identify fully with all aspects of the technique.

V. THE STUDY-RESEARCH GROUP TECHNIQUE IN RELATION TO COURSE-ENTRY MOTIVATIONS

Of the seventeen course-entry motivational items used in the evaluation, one was not scored as important by any of the respondents, and five were not scored as important by a large enough number of respondents to
permit meaningful analysis. Scores on the remaining items were tested for correlation with the extent to which participation met expectations associated with each motivational item.

Analysis revealed no strongly negative correlations, and only one highly significant positive correlation. The remainder were weakly correlated either positively or negatively.

Factor analysis of the motivational items indicated that not all commonly identified motivational factors were represented by the items. In particular, 'social welfare' was not provided for in the evaluation instrument, while 'external expectations' and 'social contact' were subsumed within other factors. However, with these limitations as qualifications, it may be concluded that the technique generally did satisfy a wide range of course-entry motivations, and was assessed in terms of commonly seen dimensions of quality.

VI. MOTIVATIONAL FACTORS

Seven acceptable motivational factors were obtained from the analysis. Four of these were comparable to those commonly identified in earlier motivational studies. These were: 'cognitive interest,' 'professional goal,' 'personal goal,' and 'escape/stimulation.' The 'social welfare' factor did not emerge since no items relating to it were included. The commonly identified factors 'external expectations' and 'social contact' did not separate from 'professional goal' and 'activity need' respectively.

Factors other than those equatable with the seven primary factors were identified also. An 'activity need' and a 'secondary activity' factor were related more closely to Houle's original activity motivation than to any of the factors identified in subsequent research. A 'local area interest' factor was identified, which related particularly to an attraction to the
geographical area.

The factoring of the limited number and range of motivational items in the evaluation instrument thus produced an acceptably meaningful, although weak, group of factors.

VII. PARTICIPATIONAL FACTORS

The initial factor analysis, of 38 participational items, involved oblique rotation of the factors and produced eleven acceptable factors. Limiting the second factoring to eight orthogonally rotated factors produced a somewhat different, but equally meaningful, set of factors.

None of the orthogonally rotated factors correlated at all highly with any of the motivational factors. The two sets thus appeared to be complementary rather than alternative measures of the same orientations. This conclusion was supported by the entry of three factors from both sets into a discriminant analysis which successfully distinguished among the study-research groups.

The factors which entered the discriminant analysis were (in decreasing order of discriminating power): 1) Increased Adult Education Interest, 2) Activity Need, and 3) Identification with the Project Activity. Some 41 percent/could be identified correctly as to their group membership.

The identified motivational and participational factors can thus be concluded as reasonably reflecting the clustering of responses to the questionnaire items involved.

VIII. PROGRAM DESIGN AND PUBLICITY

Program design and publicity items were included in the questionnaire primarily to test for any major incongruence between participant
preferences and practice, and secondarily to provide additional data on which to base future programming efforts using the technique.

The general conclusion could be drawn that the participant preferences were closely identifiable with the program design and publicity features. Major incongruence was thus not likely except in a small number of participants in terms of: the lack of intergroup contact during the survey, the preferred length of meetings, and the informal structure of the course. However, the failure of the program to reflect the preferences of some participants could well have had a negative effect on evaluation of the technique. The inadequacy of explanatory material in the pre-enrolment brochure for a significant number of participants could also have given rise to incongruence, low participation, and a generally poor evaluation by those affected.

IX. SUMMATIVE CONCLUSIONS

In defining the educational needs instrumental in development of the study-research group technique, it appears that some progress has been made.

It can be concluded that the technique has considerable potential for the meaningful teaching of research-based material and in developing critical research abilities. Further, the technique is able to provide, within a single group, instruction for the meaningful and rewarding involvement of participants having widely different educational backgrounds.

There is, however, no firm basis on which to draw conclusions regarding the technique's applicability to program areas other than the liberal studies type in which the technique has so far been applied, although Arasteh (1966) does appear to have used it successfully in undergraduate teaching of the social sciences.

The use of such a technique with other methods and in other cultures
must also remain open to further study, but on the basis of Verner's (1968) theory of diffusibility, the technique should be broadly generalizable, both to different methods and cultures. Caution, however, should be exercised in attempting cross-culture transfer since, as Verner (p.93) notes, "The usefulness of a given technique may be influenced by the previous experiences of the learner which would be a matter of culture."

All work with the technique has so far been undertaken through universities. Hopefully, other types of educational bodies will find it valuable, but it is worth noting that study-research groups are peculiarly suited to a university program. Haygood (1970) identifies four general university goals into which adult education must fit. These are stated as...

"(1) The discovery of new knowledge, through research and scholarly activities; (2) The accumulation and storage of information...; (3) The dissemination of accumulated knowledge...; (4) The application of knowledge and skills to specific situations." (p.195). The study-research group technique encompasses three of these goals (numbers 1, 3 & 4), thus adding to the likely acceptability, to the university, of adult education programs involving the technique. This should contribute to a reduction in the marginality of university extension divisions since, as noted by Clark (1958), marginality for such units derives, at least in part, from low status and a failure to perceive the work as directly related to the main aims of the university.

Another value of the technique derives from its problem-centered approach. By choosing research projects which are evidently of some potential importance to society it is possible to obtain non-university funding for the projects. This serves the dual purpose of increasing the credibility of the work as far as the university is concerned, while providing essential financial support beyond the participant course fees. This latter is of particular concern to the adult educator who must
contend, in a study-research program, with high staff/student ratios, long contact hours (and hence high fees for group leaders), and extra costs associated with the research itself.

Probably the greatest danger inherent in this technique is the tendency for solution of the research problem to become dominant over, and even suppressive of, the educational function. This is likely to be of particular importance when outside deadlines are applied to completion of the research, as was the case in the program used in this evaluation. The rather poorer evaluation of the technique in this program, compared with an earlier evaluation involving programs without such deadlines (Bagnall, 1975), is possibly a result of this influence.

Finally, it must be stated that further evaluative studies of the technique are necessary before firm conclusions as to its suitability and the boundaries of its effective application can be drawn. The present evaluation was based on participant's self-perception of their learning. Objective testing of progressive learning during the course of a program, and the extent of its application following the program should be undertaken before generalizations are made about the technique.
An evaluation of any relatively new technique, with which the associated instructors and programmers are experimenting, is limited in its external validity by the effects of the novelty on participant learning and attitudes. This problem has been identified frequently in educational research, but is one which cannot be eliminated fully except through use of the technique over time — as novelty diminishes with increasing familiarity. The generally good evaluation of the study-research group technique well may be exaggerated by this factor.

Using the evaluation tentatively as a guideline, there is cause to believe that the study-research group provides a more suitable process for the teaching of research-based material than do other techniques of adult education. This derives particularly from the emphasis, forced by the technique, on the learning of appropriate attitudes, problem-solving skills and cognitive strategies, while conforming to accepted principles of good adult education. That the study-research group technique also is suitable for participants in one group with a considerable diversity of background experiences makes it especially suitable for adult education.

It can be argued that the time required for achievement of the learning outcomes is excessive. However, it is doubtful that other techniques could achieve the same results in an equivalent time for the outcomes desired, although there are probably considerably more efficient procedures for the learning of verbal information.

The efficacy of the technique for use in more vocationally oriented programs must remain open to experimentation. Any such trials, however, should be attempted only if the desired learning outcomes are in accord
with the strengths of the technique. To use this process for vocational or other programs on which the desired outcomes are substantially in the motor skill or verbal information categories could be quite inappropriate.

At least on theoretical grounds there is good reason to believe that the technique would be suitable for use with other methods and in other cultures. But evaluated trials will be required to confirm this.

The high staff/student ratios and participant commitment required for a program employing this technique would make its accommodation to the normal fee-setting structure of adult education organizations unrealistic. To attract participants, subsidies would be required beyond the level normally applied by an organization. However, the problem-centered framework of the technique provides a logical avenue for pursuit of such funds.

While there is no logical argument against use of the technique by other organizations, it appears to be particularly congruent with the institutional goals of universities, and is thus likely to be most acceptable to these bodies.

Further evaluative research must, however, also be undertaken into the suitability of the technique within the type of program structure used in the present study. In particular, more objective, on-going testing of learning in each of the outcome categories is required.

At least for the cultural groups involved with the program studied, some programming guidelines emerge from the stated preferences of participants. High participant involvement in all phases of the work is essential. That this was not fully realised in the program undoubtedly contributed to some dissatisfaction with the technique. The involvement must cover as many programming and instructional decisions as possible — the setting of meeting schedules, the types of work undertaken and the research methods used. It must also extend throughout the research effort from identification of the problem to preparation of the research reports and publications.
The major danger inherent in use of the technique relates to a natural tendency for the research problem to assume dominance over participant learning. The program here studied showed evidence of this occurring. Avoidance of the trend would be facilitated by the selection of research projects which do not carry strict completion deadlines, no matter how realistic these may look at the start. On the other hand, avoidance of research projects carrying deadlines, does remove an element of reality and excitement from the work. It can be argued, at the very least, that unnecessary deadlines imposed by the adult education organization should be avoided.

The study-research group technique is very demanding of active involvement by the participants. Unlike the situation with many other instructional techniques, it is not possible for a participant to adopt the role of a passive onlooker. In that active involvement facilitates learning and remembering, this is a very desirable attribute. It is also valuable in that it facilitates the pooling and sharing of participant skills and knowledge pertinent to the learning and problem-solving needs of group members. On the other hand, persons who feel threatened by such exposure of their abilities and inadequacies are likely to be discouraged from enrolling and, if they do enrol, may drop out before their defensiveness is broken down. These demands placed on the participants could be an important factor in the disproportionately high participation of success-orientated persons — those from the better educated and higher socio-economic groups. However, the problem-centered framework of the technique, and its independence from sophisticated prerequisite knowledge and skills, make it potentially suitable for a wide range of socio-economic groups. With appropriately directed publicity, good counselling, and sensitive leadership, the appeal of the study-research group technique could be made much more representative of the general adult population.

It is legitimately argued that functional research cannot be under-
taken without a good basis of knowledge and grounding in the appropriate skills. No issue is taken here with such an argument. However, agreement does not extend to endorsement of the widespread opinion that it is necessary to learn a wide range of specific skills and large quantities of verbal information in a subject before one has identified any specific point of application for the skills and knowledge. This opinion can be argued against, both on theoretical grounds and from the results of this program and evaluation. Here, participants learned the necessary information and skills when these were identified as prerequisites to the solution of particular problems. In that way, learning becomes a means to an end, and acquires identifiable and comprehensible boundaries which are set by the nature of the problem. The learning acquires relevance and meaningfulness to the learner, and becomes a challenge, with a specific and foreseeable goal.

In terms of the identified need for alternative techniques in science adult education, the study-research group appears to be, at the very least, a move in the right direction. The number and range of research problems in any community must surely be of such an order as would permit an essentially endless supply of research problems. The major barrier to more general application probably lies, not with the availability of suitable problems, but with the human commitment to such programs. Skilled and sensitive program planners, committed to achieving the learning outcomes, will be required, as will acceptance by adult education institutions. Commitment of funds also will be necessary to provide realistic subsidies for the work. Of perhaps even greater importance is the need for able scientists to make their time available to supervise the work of the study-research groups.

The difficulties involved in fielding and successfully following through a program like the one studied here are easily underestimated when decisions to proceed are based on published descriptive accounts. It would
be a much simpler task to undertake any research project by conventional means such as letting a research contract to a consultancy body. It also would be considerably easier to offer adult science education using any of the existing more conventional techniques. However, if we accept the need for the learning of attitudes and abilities with which adults can make sound evaluations of the scientifically based cultural forces affecting them, then to work along conventional lines is tantamount to abrogating our responsibilities as members of a democratically based society.

In the field of science education, instructors of pre-adults have demonstrated clearly their inadequacy in meeting the real educational needs of most students. Adult educators, to date, can claim no greater success. The net results is a population dangerously ignorant of the processes of science. By accepting a continuation of the processes and structures which have given rise to this situation, we will be giving silent endorsement to its perpetuation, and will become parties to the consequences.

Alternatively, if we are prepared to shoulder our democratic and professional responsibilities, we will strive to improve on the present. We will seek to refine our knowledge of the learning required, and to improve our instructional processes as means of attaining the required learning. If we delay until we perceive perfection in this knowledge and in the educational processes, we may never act or we may do so too late. Rather, we must grasp at what we have, try it, evaluate it, refine it and extend it. Whatever our role -- whether adult educator, scientist, educational administrator, or politician -- we must act to facilitate this process of experimentation and refinement.

The study-research group technique is available as a process which can be used to further our objectives in developing a more scientifically critical and skilled adult population. It should not be left to wither into
the role of a historically interesting item, but should be applied, tested and improved, only being left to history when superseeded by more effective processes.
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APPENDIX A

Description of the Program Being Studied

The program was planned and run by the Extension Department of Victoria University, during the calendar year of 1975 (March to December).

The primary research aim of the project was to undertake a basic survey of an area covering about 2,000 hectares, which had been recommended by the Wellington Regional Planning Authority for development as a Regional Park. The type of information sought in the survey was that which would have a bearing on establishing the actual boundaries of the park, the siting of facilities for users of the park, and the subsequent management of the area.

An important secondary research aim was to obtain and record information which would be valuable and interesting to subsequent users of the park, particularly those using the area for educational purposes.

The study-research groups which undertook the project each comprised a group of interested adult members of the public working under the guidance of either one or two group leaders.

The project was financed by grants from the Wellington Regional Planning Authority, Mobil Oil, the Victoria University Internal Research Committee and Extension Department. The salaries of the supporting administrative staff and the project leader were separately funded. The grant moneys paid for most of costs involved, particularly the nominal fees paid to group leaders and the cost of materials for research, instruction and transport for groups on the project site. Publication costs of the research report (part 1) were separately provided by the University Publications Committee. These subsidies allowed the course fee paid by each participant to be pegged at $10.00.

The six study-research groups were organized around different aspects of the survey: local history, geology, botany, freshwater biology, ornithology,
and mammalogy. Each group was lead by one or two researchers who were
selected primarily for their research expertise, and secondarily for their
ability to work with adult students. They were either university faculty
members or researchers employed by the New Zealand Government.

Pre-course publicity was quite extensive, being facilitated by the
novelty and magnitude of the project. Articles appeared in all of the free
local, weekly, house-hold delivery newspapers, in both of the regional daylies,
and a discussion of the project was broadcast by a regional radio station.
A brochure was prepared which outlined the project, its objectives (educa­
tional and research), the nature of the course activities, the likely time
commitment expected of participants, the nature of expected participants,
general administrative details, and also included information on the
group leaders. It further contained uniquely marked enrolment forms. Copies
of the brochure were mailed to selected interest-groups. The main Extension
Department brochure and newspaper advertisements lodged by the department in
regional newspapers invited persons to request a copy of this project
brochure.

Enrolment was voluntary and without prerequisites, except in the
case of the ornithology group where applicants were required to possess the
capability of identifying the local avifauna by both sound and sight. To
ensure that applicants had at least, been exposed to the explanatory material,
only applications received on the special forms in the brochure were accepted.
On the forms, applicants nominated the group to which they wanted to belong
and a second choice, if they had one. Enrolments were accepted in order of
receipt, without screening, although the project leader was available to give
advice to persons requesting it. Up to fifteen enrolments were accepted for
each group, after which applicants were placed according to their second
choice. Final enrolment figures for the groups, excluding group leaders, were:
history (15), geology (17), botany (15), freshwater biology (14), ornithology (9), and mammalogy (14).

Because most adults are not accustomed to committing themselves to educational programs beyond one year, and due to the time constraints on the research contract, a time limit of ten months (March to December) was placed on the program from initial to final class meeting. Within that period, each group arranged its meeting times to suit the participants and the constraints of the subject matter.

The main project began early in March 1975 when all participants assembled in one group for the presentation and discussion of introductory material. The principal topics were: features of the area to be studied, already completed planning and sociological research of application to the proposed park, the nature of the project, and the proposed *modus operandi* of each study-research group.

After this introduction the study-research groups worked separately throughout the year in their respective fields of study. The nature and frequency of meetings and the ways in which the work was undertaken varied between groups as a result of the differing demands of the research problems and the participants' other commitment. The history group undertook much of its work by having individuals concentrate on particular sources of information and lines of investigation. Their meetings (17), generally in the evening, were used to discuss methods and findings.

In contrast, the botany group undertook most of its research as one group, although on occasions they used up to four subgroups; all sampling and recording being undertaken during the 24 meetings which were mostly day-long occasions spent in the field.

The geology, ornithology and mammalogy groups had a work program which was similarly based in the field, using one group or a number of subgroups. The freshwater biologists also worked as one group but found that
over half of their time had to be spent in the laboratory, sorting, identifying and counting specimens from collected samples. These groups held between 15 and 20 meetings.

Towards the end of November, when the study-research groups had completed the bulk of the research, each group leader prepared a summary report which included an account of the work done, the results obtained, and the conclusions and recommendations deriving from the work. A copy of this report from each group was given to all project participants and interested land-owners directly affected by the park proposals.

At this stage the participants were asked also to complete a questionnaire on their active recreational interests, both past and present, and experience in certain fields of importance in development of the park, e.g. road design and track cutting.

All interested study-research group participants and land-owners then met for a half-day for presentation of the summary reports. One week later, an evening and a full day were given to discussion of the findings, with the aim of drawing up recommendations on development and management of the proposed park. Of the 82 persons actively involved in the project, 57 participated in this discussion phase of the work. Each was placed in one of four discussion groups, the placing being designed to ensure the greatest possible breadth of experience and knowledge in each group. Thus, each discussion group included at least one member of each study-research group and, as far as was possible, participants with a range of recreational and other relevant experience. A framework of discussion topics was given to each group member.

The recommendations from the discussion groups and those made by the study-research groups, together with a few additional points made separately by some affected land-owners, were then collated and condensed by
the project leader into a set of recommendations for publication and forwarding to the Wellington Regional Planning Authority, as agreed in the research contract.
APPENDIX B

Letter Accompanying Questionnaire

[UNIVERSITY LETTER-HEAD]

26 January, 1976

Dear ..............

BELMONT REGIONAL HILL PARK PROJECT 1975

As you are aware, this project was designed with the aim of undertaking the survey while providing a stimulating educational framework for the participants such as yourself in which to learn about the subject under study and the methods used.

This "study-research group" approach to education and research is still in the developmental stage. If we are to continue with the method, improve on it, and share our experiences with other interested educational institutions, we must have detailed information on the responses of participants.

It is important that ALL participants assist with this assessment. The attitudes of those who were dissatisfied; those who failed to complete the course; those who were very pleased; and those who attended only sporadically, are all equally important to us.

To make it possible to handle the information, it must be set in a standard format. For this purpose, the enclosed questionnaire has been
prepared.

You are urged to complete the questionnaire promptly and return it to the University so that we may continue to improve our teaching in this area. Note that the information from each respondent to the questionnaire will be regarded as confidential. Any published material will be in such a form that no personal identification could be attached to any part of it. Note also, that your responses will be of value only if you are completely frank and, if necessary, ruthless in your replies to the questionnaire.

Yours sincerely,

R. G. Bagnall

Lecturer in Science
APPENDIX C
The Questionnaire

In this copy of the questionnaire, spacing has been reduced, including that provided for response to questions for which more than one line was available in the field instrument. Where appropriate, the total number of responses is shown in parentheses.

---------------------
BELMONT REGIONAL HILL PARK PROJECT

Questionnaire to Participants

Please complete this questionnaire and return it in the envelope provided not later than 21 FEBRUARY 1976.

DELETE, TICK, or PRINT as appropriate. Please do NOT underline.

1. GROUP MEMBERSHIP
   You were a member of which study-research group?
   History (8), Geology (15), Botany (13), Freshwater Biology (12), Ornithology (6), Mammology (11).

2. PERSONAL INFORMATION
   —Age in years.....
   —Male (37) / female (28)
   —Current occupation (be specific)..............................
   —Previous occupation if now unemployed, retired or committed to domestic duties..............................
   —Academic qualifications (if any), please state major subjects if degree, diploma, etc..............................
   —Previous formal study in the subject of your study-research group, including University Extension, WEA, secondary school, degree work, etc.; state subject, level (if appropriate) and organising institution..
   —Have you previously attended adult education courses in OTHER subjects?
YES / NO
—If "YES" to the previous question state, if not covered above:
the number of courses.....
the subjects..........................
the organizing institutions..........................

3. KNOWLEDGE OF THE SUBJECT
From which of the following sources did you first learn of the project and the fact that you might participate in it?
—from a friend (9)
—from a newspaper article (4)
—from a newspaper advertisement (3)
—from a radio broadcast (0)
—from receiving the brochure—solicited or unsolicited (34)
—from seeing the brochure in a library or similar place (9)
—from the University Extension office or staff (6)

4. PRE-ENROLMENT INFORMATION ON THE PROJECT
Indicate, with a tick in the appropriate column, the adequacy of the brochure description with regard to each of the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>less than adequate</th>
<th>adequate</th>
<th>more than adequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>the nature of the subject matter</td>
<td>(5)</td>
<td>(57)</td>
<td>(3)</td>
</tr>
<tr>
<td>the course technique</td>
<td>(15)</td>
<td>(48)</td>
<td>(2)</td>
</tr>
<tr>
<td>the expected commitment of your time</td>
<td>(10)</td>
<td>(49)</td>
<td>(4)</td>
</tr>
</tbody>
</table>

5. COURSE APPEAL, YOUR EXPECTATIONS AND SATISFACTION
In the table below:
(1) in the left hand section, number up to five items that most appealed to you in the project at the time of enrolment. Number from 1 (most important) to 5 (least important). Use each number only once. If more than five items were important, you may tick those beyond
the fifth.

(2) in the right hand section of the table, please tick the appropriate column, opposite each of the items which you have numbered or ticked, to indicate the degree to which your interest was satisfied.

<table>
<thead>
<tr>
<th>INITIAL APPEAL OF THE PROJECT</th>
<th>DEGREE OF SATISFACTION WITH PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>- the thought of working with other similarly interested persons: 1(2), 2(5), 3(3), 4(10), 5(7), ✓(2)</td>
<td>low (2) satis-factory (16) high (13)</td>
</tr>
<tr>
<td>- it might help to use up spare time: 3(1), 4(1)</td>
<td>(1) (1) (0)</td>
</tr>
<tr>
<td>- it could be a good way to learn about the subject: 1(14), 2(8), 3(9), 4(7), 5(4), ✓(4)</td>
<td>(3) (16) (26)</td>
</tr>
<tr>
<td>- you enjoy working outside: 1(1), 2(5), 3(6), 4(8), 5(12), ✓(3)</td>
<td>(2) (8) (26)</td>
</tr>
<tr>
<td>- it would give you an opportunity to get away from home: 1(1), 3(1), ✓(1)</td>
<td>(0) (0) (3)</td>
</tr>
<tr>
<td>- it might start you on a new hobby: 2(1), 3(1), 4(1), 5(1)</td>
<td>(2) (1) (2)</td>
</tr>
<tr>
<td>- it could have been a good preliminary to other related work: 1(2), 2(3), 3(5), 4(3), 5(5), ✓(2)</td>
<td>(7) (9) (3)</td>
</tr>
<tr>
<td>- it let you out of some domestic chores:</td>
<td>(0) (0) (0)</td>
</tr>
<tr>
<td>- a friend was also participating: 1(1), 2(1), ✓(1)</td>
<td>(0) (1) (2)</td>
</tr>
<tr>
<td>- you liked the idea of being involved with a research project and its publication: 1(5), 2(6), 3(6), 4(8), 5(3), ✓(2)</td>
<td>(7) (13) (8)</td>
</tr>
<tr>
<td>- to work with a particular group leader: 1(1), 2(5), 3(3), 5(3), 1(4)</td>
<td>(0) (5) (11)</td>
</tr>
<tr>
<td>INITIAL APPEAL OF THE PROJECT</td>
<td>DEGREE OF SATISFACTION WITH PROJECT</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td></td>
<td>low</td>
</tr>
<tr>
<td>the project was related to your occupation:</td>
<td></td>
</tr>
<tr>
<td>the project was NOT related to your occupation:</td>
<td></td>
</tr>
<tr>
<td>1(1), 2(1), 3(5), 4(1), 5(3), √(2)</td>
<td>(0)</td>
</tr>
<tr>
<td>you were interested in the geographical area:</td>
<td></td>
</tr>
<tr>
<td>1(7), 2(7), 3(5), 4(9), 5(4), √(1)</td>
<td>(1)</td>
</tr>
<tr>
<td>you were interested in the subject of your study-research group:</td>
<td></td>
</tr>
<tr>
<td>1(15), 2(9), 3(6), 4(5), 5(3), √(1)</td>
<td>(5)</td>
</tr>
<tr>
<td>you were interested in the recreational-planning aspect of the project:</td>
<td></td>
</tr>
<tr>
<td>1(8), 2(5), 3(9), 4(6), 5(6), √(4)</td>
<td>(7)</td>
</tr>
<tr>
<td>other (please specify):</td>
<td></td>
</tr>
<tr>
<td>2(1), 3(1), 5(1), √(5)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

6. **ADDITIONAL GAINS**

Did you derive anything else from the course? YES (40) / NO (25)

If "YES" please specify: ...........................................................

7. **EDUCATIONAL OBJECTIVES**

The primary educational objectives of these study-research groups may be stated as follows; pleases indicate, in the appropriate column, the extent to which each was realized in your case:

| YOUR ASSESSMENT |
|-----------------|----------------|----------------|
| poorly          | reasonably     | well           |
| (10)            | (22)           | (31)           |

1) to increase your understanding of the study-research group subject as a field of study (not merely as a collection of facts and
explanations):

2) to increase your ability to analyze, criticize and appreciate the limitations of research work in the area of study:

If you answered "poorly" or 'reasonably' to either of the above, what type of course do you think would better meet these objectives?

— for objective 1) .................................................................

— for objective 2) .................................................................

8. EDUCATIONAL VALUE

The following have been suggested as the main educational strengths of the study-research group technique; indicate for each one, by ticking the appropriate column, the degree to which you concur in the case of this project.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Doubt it</th>
<th>It is probably correct</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>maintains student interest in studying the subject</td>
<td>(0)</td>
<td>(5)</td>
<td>(29)</td>
</tr>
<tr>
<td>facilitates the welding of a group into a working team</td>
<td>(0)</td>
<td>(3)</td>
<td>(38)</td>
</tr>
<tr>
<td>makes good use of existing skills of group members</td>
<td>(0)</td>
<td>(4)</td>
<td>(22)</td>
</tr>
<tr>
<td>encourages learning by making the material meaningful</td>
<td>(1)</td>
<td>(2)</td>
<td>(20)</td>
</tr>
<tr>
<td>encourages learning by providing for reinforcement and practice</td>
<td>(0)</td>
<td>(3)</td>
<td>(26)</td>
</tr>
<tr>
<td>encourages learning by providing for self-assessment as results are worked up, discussed and checked</td>
<td>(0)</td>
<td>(19)</td>
<td>(22)</td>
</tr>
<tr>
<td></td>
<td>strongly disagree</td>
<td>doubt it</td>
<td>it is probably correct</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>-provides a means of teaching research-based subjects as they really are, namely an integration of existing information and research</td>
<td>(0)</td>
<td>(2)</td>
<td>(23)</td>
</tr>
<tr>
<td>-develops in students a more informed and critical attitude towards research</td>
<td>(0)</td>
<td>(8)</td>
<td>(25)</td>
</tr>
<tr>
<td>-provides a means of involving students in original and important applied research</td>
<td>(0)</td>
<td>(5)</td>
<td>(22)</td>
</tr>
<tr>
<td>-enables each student to set his or her own pace of learning and level of participation</td>
<td>(3)</td>
<td>(7)</td>
<td>(25)</td>
</tr>
</tbody>
</table>

9. ATTENDANCE

- If you did not attend all scheduled meetings, how many (approximately) did you miss? .... (average = 27%)
- Why? .................................................................
- Did you: attend sporadically? .... (49) stop attending after a while? .... (11)
- If "sporadically," did your attendance: improve during the year?...(1) decline during the year? ... (5)
- Could the organizers or group leaders have done anything to increase your attendance? YES (13) / NO (51)
- If "YES," please state .................................................

10. YOUR BACKGROUND IN THE SUBJECT

- Did you find your background, if any, in the subject of your study-research group to be: —insufficient .... (4)
If you had no background in the subject of your study-research group was this a hindrance? YES (7) / NO (11)

11. INTRODUCTORY MATERIAL ON THE PROJECT

- Did you find the material presented at the first two meetings to be:
  - too superficial.....(4)
  - adequate.....(50)
  - too detailed.....(10)

- How could it have been better presented?..............................

12. BACKGROUND READING DURING THE COURSE

- Would you prefer:—hand-out material (assuming that you pay for it in an initially higher fee)?.....(7)
  - references to source material (for you to buy or borrow)?.....(9)
  - a mixture of both the above?.....(45)

- Was the amount of hand-out and/or reference material given during the course:—insufficient?.....(15)
  - adequate?.....(46)
  - excessive?.....(2)

13. CONTINUED POST-COURSE STUDY

- Should you wish to continue study on your own in the subject of your study-research group, do you think that this course has:
  (a) added to or given you the ability to do so?.....(51)
  (b) not increased or not given you the ability to do so?.....(10)

- if 'b' can you suggest any reasons?........................................

- Has the course: (a)—encouraged you to seek other courses in the subject?.....(29)
  - discouraged you from seeking other courses in
the subject?......(2)
—not altered your motivation?......(34)

(b)—encouraged you to seek courses in other
subjects?......(23)
—not altered your motivation?......(42)

14. GROUP SIZE

Assuming that there is only one group leader at any one time for a study-
research group, how many persons would you consider to be an ideal number
for one group?......

15. INTERGROUP CONTACT

—Would you have preferred more contact (discussion of methods, results,
etc.) between study-research groups during the year? YES (43) / NO (16)
—If 'YES' have you any comments?.................................

16. SCHEDULING OF MEETINGS

The introductory meetings must be prescheduled (dates printed in the
brochure); would you prefer other meetings to be:
—prescheduled?......(13)
—scheduled by group discussion (as in this project)?......(52)

17. LENGTH OF MEETINGS

Would you prefer meetings to be:—half a day in length?......(26)
—full-day in length?......(42)
—condensed into one block (2-3 weeks in January)?......(2)

18. FREQUENCY OF MEETINGS

—Assuming full-day meetings, what frequency do you prefer?
—weekly......(8)
—fortnightly......(23)
—monthly......(22)
—Assuming half-day meetings, what frequency do you prefer?
  —weekly.....(9)
  —fortnightly.....(29)
  —monthly.....(8)

19. WEEKEND MEETING DAYS

Do you prefer:—Saturdays?.....(14)
  —Sundays?.....(11)
  —a mixture of both?.....(39)

20. LENGTH OF PROJECT

—Would you have preferred this course to be:
  —condensed into a six month period?.....(12)
  —extended to, say, two years?.....(24)

—Have you any comments?...........................................................

21. COURSE FEE

The cost of this project was covered largely by grants from the Wellington Regional Planning Authority, Mobil Oil and the University. The fee paid by you ($10.00) would have been about $50.00 without this assistance. Would you have enrolled had the fee been of this order? YES (7) /NO (57)

22. SUGGESTIONS

Have you any other suggestions for the improvement of projects such as this?..........................................................
APPENDIX D

Numbered List of Variables Used in Factor Analyses

In the following lists the variable numbers refer only to those used in the text of this dissertation. They are not referable to those in the questionnaire instrument. The weighting and ranking of the variable values is shown in parentheses following each variable.

A. Motivational Factors

1. The thought of working with other similarly interested persons (1 = item of minor importance, 2 = item fifth in order of importance, 3 = item fourth in order of importance, 4 = item third in order of importance, 5 = item second in order of importance, 6 = item most important)
2. It might help to use up spare time (as above)
3. It could be a good way to learn about the subject (as above)
4. I enjoy working outside (as above)
5. It would give me an opportunity to get away from home (as above)
6. It might start me on a new hobby (as above)
7. It could be a good preliminary to other related work (as above)
8. It let me out of some domestic chores (as above)
9. A friend was also participating (as above)
10. I liked the idea of being involved with a research project and its publication (as above)
11. To work with a particular group leader (as above)
12. The project work is related to my occupation (as above)
13. The project work is not related to my occupation (as above)
14. I am interested in the geographical area (as above)
15. I am interested in the subject of the study-research group (as above)
16. I am interested in the recreational-planning aspect of the project
17. Other items not noted on the questionnaire instrument (as above)

B. Participational Factors

21. Age (actual age in years)

22. Sex (1 = male, 2 = female)

23. Socio-economic status (1 = highest socio-economic category, 2 = second highest, 3 = third, 4 = fourth, 5 = fifth, 6 = lowest socio-economic category)

24. Background in research (1 = without, 2 = with)

25. Previous non-credit education in the discipline of the study-research group (0 = none, 1 = one course, 2 = two or more courses)

26. Previous education for credit in the discipline of the study-research group (0 = none, 1 = at school sixth form level, 2 = at school seventh form level, 3 = at Diploma or Certificate at tertiary level, 4 = at undergraduate degree level, 5 = at graduate degree level)

27. Number of adult education courses previously participated in (0 = none, 1 = one course, 2 = two courses, 3 = three or more courses)

28. Highest formal academic qualifications (0 = none, 1 = qualifications other than those following, 2 = School Certificate, 3 = University Entrance and/or Higher School Certificate, 4 = Certificate or Diploma, 5 = Baccalaureate degree, 6 = Honors and/or Masters degree, 7 = Doctoral degree)

29. Organising institution for adult education courses previously taken; highest one only (1 = other than those following, 2 = secondary school evening program, 3 = Workers Education Association, 4 = university)

30. Adequacy of the project publicity brochure with regard to the nature of the subject matter (1 = less than adequate, 2 = adequate, 3 = more than adequate)
31. Adequacy of the project publicity brochure with regard to the course technique (as in 30)

32. Adequacy of the project publicity brochure with regard to the expected commitment of individual time (as in 30)

33. Realization of educational objective — to increase individual understanding of the study-research group subject, as a field of study, rather than as a collection of facts and explanations (1 = poorly, 2 = reasonably, 3 = well)

34. Realization of educational objective — to increase individual ability to analyze, criticize and appreciate the limitations of research work in the area of the study (as in 33)

35. Educational value of the technique — maintains participant interest in studying the subject (1 = strongly disagree, 2 = doubt it, 3 = it is probably correct, 4 = strongly agree)

36. Educational value of the technique — facilitates the welding of the group into a working team (as in 35)

37. Educational value of the technique — makes good use of existing skills of group members (as in 35)

38. Educational value of the technique — encourages learning by making the material meaningful (as in 35)

39. Educational value of the technique — encourages learning by providing for reinforcement and practice (as in 35)

40. Educational value of the technique — encourages learning by providing for self-assessment of progress (as in 35)

41. Educational value of the technique — provides a means of teaching research-based subjects as they really are, namely an integration of existing information and research (as in 35)

42. Educational value of the technique — develops in participants a more informed and critical attitude towards research (as in 35)
43. Educational value of the technique — provides a means of involving learners in original and important applied research (as in 35)

44. Educational value of the technique — enables each participant to set his or her own pace of learning and level of participation (as in 35)

45. Attendance of course meetings (% of meetings attended)

46. Adequacy of introductory material presented at the first two meetings (1 = too superficial, 2 = adequate, 3 = too detailed)

47. Adequacy of the reference and reading material provided during the course (1 = insufficient, 2 = adequate, 3 = excessive)

48. Influence of participation on ability to undertake individual study in the subject of the study-research group (1 = not added to provided, 2 = added to or provided)

49. Influence of participation on motivation to participate in further courses in the same subject (1 = discouraged, 2 = not changed, 3 = encouraged)

50. Influence of participation on motivation to participate in courses in other subjects (1 = not changed, 2 = encouraged)

51. Preferred number of participants in a study-research group with one leader at any time (number of participants)

52. Preference for more contact between study-research groups than was the case in this project (1 = no, 2 = yes)

53. Preference for scheduling group meetings by group discussion, rather than working to a prescheduled timetable (1 = no, 2 = yes)

54. Preferred length of meetings for study-research group projects (1 = halfday, 2 = either half or fullday, 3 = fullday, 4 = block course)

55. Assuming full day-length meetings, preferred frequency of meetings for study-research group projects (1 = weekly, 2 = either weekly or fortnightly, 3 = fortnightly, 4 = either fortnightly or monthly, 5 = monthly)
56. Assuming half day-length meetings, preferred frequency of meetings for study-research group projects (as in 55)

57. Preferred total time span of a study-research group project (1 = six months, 2 = one year, 4 = two years)

58. Enrolment if fee had been $50.00 rather than $10.00 (1 = no, 2 = yes)
R.G. Bagnall

PUBLICATIONS

— *Seimatosporium leptospermi* sp. nov. on leaves of *Leptospermum scoparium* Forst. in New Zealand and *L. juniperinum* J.E. Sm. in Australia. (with J.E. Sheridan) *New Zealand Journal of Botany*, 1972, 10, 69-73.


