DOCUMENT RESUME

ED 275 870 CE 045 470

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TITLE TAFE Curriculum Research: A Review of Group Process Methods.
INSTITUTION TAFE National Centre for Research and Development, Payneham (Australia).
REPORT NO ISBN-0-86397-185-7
PUB DATE 86
NOTE 182p.; For a related document, see CE 045 471.
AVAILABLE FROM Nelson Wadsworth, P.O. Box 4725, Melbourne, Victoria 3001, Australia.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC08 Plus Postage.
DESCRIPTORS Brainstorming; Critical Incidents Method; Curriculum Development; *Curriculum Research; Delphi Technique; *Educational Needs; Force Field Analysis; Foreign Countries; *Group Dynamics; *Needs Assessment; Postsecondary Education; *Research Methodology; Research Utilization; Secondary Education; *Technical Education; Technological Advancement; Vocational Education
IDENTIFIERS Australia; DACUM Process; Nominal Group Technique

ABSTRACT

The issue of how to react quickly to the educational needs arising from technological change has been deemed a central problem facing Technical and Further Education (TAFE) in Australia. Therefore, a national study examined various curriculum research methods that hold promise for speeding up the curriculum research and development process. The first phase of the study consisted of a description and analysis of group process methods. The following methods were analyzed: the Nominal Group Technique, the Developing a Curriculum Process (DACUM), the critical incident technique, Force Field Analysis, and brainstorming. It was concluded that the Search Conference, Delphi and exploratory methods, and, to a lesser extent, the Nominal Group Technique hold promise for providing data for adapting curriculum to occupational structural change. DACUM, while a promising method of obtaining data in the cognitive domain, may need to be linked to other methods that are more sensitive to change when used as a curriculum research procedure on occupations undergoing structural change. The critical incident technique can be advantageous in curriculum research for short courses, and Force Field Analysis appears best suited for use as an adjunct to other group process methods. In addition to describing the research project and its findings, this report includes several chapters of practical guidelines on using and blending the various group process curriculum research methods. Appendixes include descriptions of some questionnaire methods used and a sample search conference, observational studies, and a DACUM chart. Four pages of references and figures and tables are included. (MN)

TAFE NATIONAL CENTRE FOR
RESEARCH AND DEVELOPMENT

TAFE CURRICULUM RESEARCH: A REVIEW OF GROUP PROCESS METHODS

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ADELAIDE 1986

ISBN 0 86397 185 7
TD/TNC: 12.12

Published by:

TAFE National Centre for
Research and Development
296 Payneham Road
Payneham SA 5070

(Incorporated in South Australia)

Distributed by Nelson Wadsworth, PO Box 4725, Melbourne VIC 3001,
for TAFE National Centre for Research and Development Ltd.

Printed by D. J. WOOLMAN, Government Printer, South Australia

FOREWORD

A central problem facing TAFE in the 1980s is how to react quickly to the educational needs which arise from technological change?

This national study was designed to investigate TAFE curriculum research methods which hold promise for speeding up the curriculum research and development process. The study was planned to have three linked components: (1) description and analysis of group process methods, noting suitability, strengths, weaknesses, requirements for implementation, pitfalls and so on; (2) evaluation of methods by comparison of carefully monitored case studies on the same occupational grouping in separate States/Territories; and (3) development of methods, in effect a fine-tuning of the methods suitable for TAFE usage.

This report represents the completion of the first component. For various reasons beyond the control of the researchers, the case studies necessary for completion of components (2) and (3) have not yet been pursued.

Where possible the authors have attempted to describe each research method in sufficient detail for an educator or researcher to apply them, though some methods are described in greater detail than others.

The authors undertook the study whilst working in the Curriculum Services Directorate of the NSW Department of TAFE; Neil Jones as Senior Education Officer and Dr Tony Anderson as Education Officer. The authors would be interested to hear of any studies, particularly of an evaluative nature, based on the methods outlined in this report.

This report includes, in Part V, a summary of the findings of a companion study by the same authors examining the role of the facilitator in planning and conducting curriculum research group process methods, titled: The Facilitation of Curriculum Research Workshops in TAFE, also published by the TAFE National Centre for Research and Development.

ABSTRACT

This TAFE national project examines ways in which technical and further education curriculum research can be speeded-up in the data collection and analysis phases. After discussing the need for preliminary investigation the study describes and analyses the following research procedures: exploratory (qualitative) research, the Search Conference Method, the DACUM (developing a curriculum) Method and derivatives of DACUM, the Nominal Group Technique, the Delphi Method, the Critical Incident Technique and Force Field Analysis. The methods were chosen after reviewing the literature and research methods used in TAFE. Since these methods provide different perspectives on occupational analysis and therefore yield different types of data, some ways in which they can be used in combination are covered. A guide to the selection of the methods is provided.

The planning and implementation of curriculum group-process methods is summarised in terms of the value orientations (overarching principles which guide choices between alternatives) and social rules (practical guides for action) which a group facilitator may adopt. A model of the general stages and steps in planning and conducting curriculum research workshops is included. Some issues which arise in the use of group-process methods, such as strategies for 'conflict resolution', are highlighted.

Appendices cover some questionnaire methods for occupational analysis, a program for a short Search Conference, a brief description of an observational method for the study of skill masters, and some examples of DACUM charts.

The methods reviewed offer, in varying degrees, ways of shortening the curriculum research and data analysis process. The Search Conference, Delphi and exploratory methods and, to a lesser extent, the Nominal Group Technique (NGT) hold promise for providing data to enable curriculum to be adapted to occupational structural change.

The NGT method appears to offer a useful approach for identifying the issues to be addressed in curriculum development and is a useful 'conflict resolution' procedure in certain situations.

The DACUM method, regarded as a quick and effective means for analysing occupational education needs at the psycho-motor level, holds promise, when linked to Delphi-type processes, of providing data in the cognitive domain (e.g.

central educational concepts and the knowledge/skills needed to carry these concepts into effective task performance on the job). DACUM is also promising for detailing 'the there and now' of work functions but, in its traditional form, appears less effective, compared with the Search Conference, Delphi and exploratory research, in detecting change within occupations. DACUM, therefore, may need to be linked to other methods more sensitive to change when used as a curriculum research procedure on occupations undergoing structural change. Or it may need to include an additional segment which looks at trends within the occupation, possibly at the end of the DACUM session.

The Critical Incident Technique is seen as offering advantages in curriculum research for short courses, especially where urgent information is sought on the immediate, practical knowledge needed by students. It can also be used in assessing what 'critical' knowledge needs to be included in a course for assessing students' perceptions of the relevance of a program to their needs.

Force Field Analysis, since it enables a planning group to highlight the strengths and weaknesses of the forces affecting the implementation of change, appears best suited for use as an adjunct to other group process methods or in teacher workshops examining how occupational data can be translated into a curriculum.

ACKNOWLEDGEMENTS

We wish to thank the many people inside and outside TAFE who contributed to this project. In particular, we owe a debt to the help and support given by Mr Graham Hermann, Executive Director of the TAFE National Centre for Research and Development, which commissioned the project to the NSW Department of TAFE, and to Dr Sandra Humphrey, NSW Department of TAFE, for supporting the project initiative. Our special thanks are also expressed to each member of the project's advisory committee: John Braddy, Victorian TAFE Board; Alan Bowen, Queensland Division of TAFE; Dr Jenny Noesjirwan, Kuringai College of Advanced Education; Ron England, Geoff Hawke, Hank Waalkens and Ralph Catts, NSW Department of TAFE and Graham Hermann.

During the project we received considerable assistance from Tom Lyons, Tim MacDonald and Brian Brand, Western Australian Division of TAFE and Dr Alastair Crombie, Australian National University; Graham Foster, Victorian TAFE Board; Dr David Boud, Tertiary Education Research Centre, University of NSW; and Dr David Laird, University of New England. The NSW TAFE library staff, Jane Butterworth, Kate Burnham and Glenda Rowsell gave excellent and imaginative assistance in the conduct of the extensive literature searching for the project. Diane Dawson and later Rosemaree Dowling were instrumental in preparing the descriptive bibliography, published separately. Special thanks are also due to Laurie Field of the NSW Institute of Technical Adult Teacher Education, for bringing to our attention a number of important literature sources.

For the detailed comments and suggestions made by Dr Jenny Noesjirwan and Mr Kevin Parkinson, who reviewed this report on behalf of the TAFE National Centre for Research and Development, we express our thanks.

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CHAPTER 1

ORIENTATION

1.1 BACKGROUND TO THE RESEARCH PROJECT

At the commencement of this project in 1983 a number of TAFE researchers and curriculum developers had begun to show interest in and to use research methods which are relatively new to TAFE, including methods currently in use by sociological and educational researchers outside TAFE. Some of these methods depend less upon the collection of masses of detailed data about occupational work functions than has traditionally been the case in TAFE, and focus more on occupational structure and change. Moreover, there has been substantial pressure from outside TAFE for TAFE to adopt faster and less costly methods for ascertaining the educational needs of an occupation. Indeed, industry representatives on curriculum advisory committees and Apprenticeship Authorities and Labour and Industrial Commissions, have for some years been openly critical of the time and costs involved in many of TAFEs responses to problems requiring the analysis of occupational or community needs for curriculum development purposes.

In view of these contributing factors it was opportune for TAFE to undertake research which would focus on an analysis of research techniques which promised 'fast-response' and 'effectiveness' for the purposes of curriculum design and review.

This report presents a review of a number of methods. Most use workshop or seminar approaches. Other methods have been included, such as exploratory research, the Critical Incident Technique and observational studies of skill masters, as these have particular strengths when used in combination with group process methods. We have not dealt with questionnaire methods, other than to briefly describe some in Appendix A, because we see these methods as options to be used following group process or other methods where validation is required of the course directions set by group process or exploratory methods. It should be stressed that some of the methods discussed here have not been trialled extensively in vocational curriculum research in TAFE. These include the Search Conference method, the Nominal Group Technique, and the Critical

Incident Technique. There would be an opportunity, therefore, to continue the work begun in this project to address the remaining two components that were originally envisaged:

1. Evaluation of the methods derived from comparative case studies including a consideration of the suitability of the methods to particular TAFE study areas, target populations, occupational areas or curriculum problems, as appropriate.

2. Fine-tuning of the methods suitable for use in TAFE including a commentary on the professional development needs of potential users of the methods.

1.2 SCOPE AND AIMS

This study aims to inform curriculum developers of a range of occupational research methods for use in TAFE which purport to offer a shorter response time in data collection and analysis for curriculum development in technical and further education. The methods covered are:

- Preliminary investigation
- Exploratory (qualitative) research
- The Search Conference Method
- The Nominal Group Technique
- The Delphi Method
- The DACUM (developing a curriculum) method and derivatives
- The Critical Incident Technique
- Force Field Analysis

Each method has been presented with the aim of providing intending users with sufficient information about the uses of the method, the data produced, how the method is used, and what are its pitfalls. Where possible, details of duration, cost, time and resources needed, have been included. Since the methods covered provide different types of data, ways in which the methods may be blended or used in combination, are discussed.

Most of the methods described use group-process techniques, which entail a

'specialist' group meeting in a seminar or workshop setting to analyse an occupation. Therefore the report also includes a summary of a study of the role of the facilitator/group leader in the conduct of curriculum research group process methods (Anderson and Jones, 1986).

Decisions about the choice of methods must always consider the amount of supporting evidence which an accreditation body may require for allocation of resources for a particular program. With the exception of the Delphi method, the study does not cover questionnaire methods for deriving and analysing occupational data. This is not to deny the effectiveness with which questionnaire methods can provide comprehensive information about need and demand for education. Questionnaire methods have a vital role to play and are widely used in TAFE especially where the decision to allocate substantial resources must be based on demonstrated need and demand. However, concern has been expressed within and outside TAFE about large-scale questionnaire surveys. This concern centres around:

(a) the time taken to mount and process large surveys ('blockbusters');

(b) doubts about the reliance which can be placed on surveys with response rates of around 40-50 percent which mean that possible biases within the non-response group remain unknown;

(c) uncertainty about the ability of questionnaires to provide an accurate picture of complex work functions in an industry, a problem facing any curriculum research method;

(d) the difficulties experienced in data interpretation.

Problems with interpretation arise because questionnaire methods which purport to examine the detail of tasks performed, no matter how thoroughly, often do not provide the data analyst with guides as to how this data is to be translated into a curriculum. This remains a question of interpretation which is often the subject of dispute during the curriculum design stage due to subjective bias. As Connell et al. (1982:26) point out, the only thing that orthodox surveys do well is to collect a few simple facts about largish numbers of people, at the expense of understanding.

The problem of achieving an understanding of the nature of skills in

occupational work and how to teach these skills is rendered difficult because occupational work functions involve complex and overlapping conceptual knowledge and practical skills. The importance of obtaining a broad understanding of an occupation in order to base decisions about course structure, aims and content areas on research rather than on interpretive guesses, is taken up in the section on exploratory (qualitative) research methods (Section 2.1).

Reservations about large scale surveys have led decision makers in TAFE to ask: In what ways can TAFE curriculum researchers improve data quality and speed up the data collection and analysis process of curriculum research? Therefore, this study was commissioned to examine so-called 'fast-response' methods for occupational data collection and analysis for purposes of course design and review in TAFE.

1.3 QUESTIONS WHICH GUIDE SELECTION OF CURRICULUM RESEARCH METHODS

Table 1.1 sets out a number of issues and questions which guide selection of the methods covered by this study. Since each method has specific strengths and weaknesses a summary of the main features of the methods is given in Section 1.4 and 1.5 prior to the detailed descriptions of the methods in Chapters 2 and 3.

Broadly, there are three sets of issues to be considered in selecting a research strategy. These concern content, methodology and the problems associated with introducing change. Content issues include:

1. The 'what' versus the 'how' of curriculum.

2. The relative emphasis which should be placed on identifying and learning skills as opposed to understanding the underlying concepts.

3. The relative emphasis which should be placed on identifying the future directions in which an industry is moving and emerging skill requirements, as opposed to analysing the 'here and now' of work in an industry to identify the skills and knowledge currently needed.

Methodological issues include:

1. The relative strengths of qualitative and quantitative research methods.

2. Sampling bias in the selection of key informants and workshop participants and the accuracy/reliability of data so obtained. This is equally an issue for all methods.

3. To what extent should educators as well as practitioners be involved in group process research methods.

4. Who controls the workshop output (the tension between researcher directed focus and participant directed focus).

Problems of introducing change are complex but two issues need to be highlighted: (A) the problem of a providing sound rationale for resource allocation in times of constraints on funding and (B) the problems of selecting a curriculum research and development process which will facilitate implementation of a curriculum. The latter issue is related to the so called 'change agent' role of researchers and educators and opens up questions of what is an appropriate consultancy role relationship between researchers, curriculum developers and curriculum implementers. (See Appendix B for an example of a consultancy model used for a fast-response curriculum development project in NSW TAFE.)

There are no easy answers to any of these issues. Content issues are taken up again in Chapter 4 when we discuss ways of blending research methods and methodology issues are taken up in Chapter 6. Table 1.1 lists some key questions to be borne in mind when selecting research methods.

Table 1.1

Questions which guide selection of so-called 'fast-response' curriculum research methods.

Key Question	Curriculum Research Method
What is currently available that bears on curriculum development in the area?	Preliminary investigation
Do you need to describe the general field to be covered by a course and to identify the main elements in this field and their interrelationships, or to identify the major questions which curriculum research should address?	Exploratory research Student profiling Graduate student survey
Is the occupation undergoing substantial change?	Exploratory research The Delphi Method The Search Conference
Is the occupation relatively stable?	DACUM (or derivatives)
Is there group tension about the direction a course review should take?	Search Conference Nominal Group Technique (Possibly Force Field Analysis)
Is urgent information needed about the critical knowledge needed to perform specific work functions?	Critical Incident Technique
Does the data derived from any of the methods require validation or does the derived program require validation?	Questionnaire

1.4 PRELIMINARY INVESTIGATION

While preliminary research is, by nature exploratory, a distinction will be made between preliminary work of the kind described here and the techniques

of exploratory (qualitative) research described in Section 2.1.

All curriculum development projects in TAFE should include some form of preliminary investigation. Preliminary investigation is important because sufficient information may be obtained which simplifies the curriculum research project by showing where gaps exist in available knowledge. Moreover, suitable curriculum materials or even a syllabus may be turned up during the preliminary investigation phase, enabling research strategies such as pre-testing or other forms of validation to be used if confirmation of the relevance of the syllabus is needed.

The scope of preliminary work varies, of course, according to time and other constraints and may touch on some or all of the following areas, depending on the size and importance of the project.

(a) Investigation of the relevance to curriculum design and implementation of legal or regulatory requirements bearing on the occupation including awards, codes of safe practice.

(b) Identification of the strengths and weaknesses in the existing educational program including: views of teachers; evaluation of outcomes for graduates of the program; and development of a profile of students which may include:

- Age, sex and educational background (including literacy and numeracy levels);
- Work experience;
- Work performed by the employer (broad categories);
- Work performed by the student:
  - specific processes performed
  - variety of work performed
  - extent of control, if any, over the nature of the work including its scope and depth
  - opportunity for making decisions about the tasks performed, i.e. scope for putting own ideas into practice
  - students' views about shifts/trends within the occupation

- students' views about their career paths (e.g. stay 'on-tools', move into management or supervision, start own business)

- students' views about strengths and weaknesses in the education received, including problems being encountered with the order in which the course is traversed, addressing, if needed, questions of whether knowledge which students see as vital to be acquired early in the program are placed, in their view, too far into the course (see Critical Incident Technique)

- students' reasons for abandoning training

- examination of students use of other educational sources.

(c) Collection of relevant data from: Australian Bureau of Statistics (ABS); Australian Standard Classification of Occupations (ASCO); Kompass (industry) directory; research reports, e.g. survey or review reports, workforce forecasts, occupational analyses, instruction/training manuals, curriculum documents, teacher reports, theses, records of advisory committee meetings.

(d) Identification of other curriculum work in the same or related fields, through literature searches including the TAFE National Clearinghouse publications: Initiatives in TAFE and Projects in Progress.

(e) Consideration of TAFE policy in relation to the area (e.g. equality of opportunity, occupational health and safety, etc). Sources of TAFE policy including policy and/or curriculum units within TAFE; policy statements by senior officers; CTEC Triennium reports (TAFEC); Committee of Enquiry reports from other government departments.

(f) Identification and consultation with key informants with a broad grasp or detailed knowledge of the area.

(g) Identification and consultation with decision-makers, client groups, audiences and stakeholders:

. within TAFE, such as schools, colleges, regions, teachers, students, senior officers, curriculum specialists;

. outside TAFE, such as employer and employee groups, other government departments, other educational providers, National Training Council, Industry

Training Committees (see section on exploratory research).

(h) Identification of the key influences which are impinging on the occupational area (technological, economic, structural, social) especially changes which are likely to take effect during the next ten years (see sections on exploratory research, the Search Conference and the Delphi methods).

(i) Clarification of the areas which the research needs to cover and formulation of the research questions that the project will need to address (see section on exploratory research).

(j) Finalise (or make recommendations) about the project research design including data sources, data collection and analysis methods, critical project decision points, timetabling, staffing and budget.

1.5 SUMMARY OF METHODS

Exploratory (qualitative) research methods

Uses

To ascertain the broad thrust of a course offering in terms of scope, weights of emphasis to be given to segments of the program, depth of coverage within subjects and the more important aspects of subject sequencing. Properly handled, exploratory research is particularly useful when little information is available about an occupation and for obtaining an understanding of the structural complexities of an occupation as a prelude to identifying specific data needs for curriculum design.

Data collection method

The first step is to decide the research questions which are to be explored in interviews with key informants or in group discussion. Research questions are the broad questions which guide and focus the data collection and analysis phases. Examples are: 'In what ways is technological change altering the pattern of work skills in an occupation?' and 'What should be the central outcomes of the level of course being designed/reviewed?' The research questions should span the occupational/social context level (the wider forces which shape immediate knowledge needs or future needs which the educational program would anticipate) and the individual level, so as to allow student needs

to be related to an understanding of how work in the occupation is organised.

These research questions are usually divided into finer questions such as those used as probes in interviews. Since the aim of exploratory research is to explore, new questions are added as the process unfolds. The aim is to achieve a broad understanding of the occupation in terms of patterns or common themes but not to be deceived by initial appearances: to look for cracks or flaws in the emerging data and to follow up the questions that these pose.

Sample

This depends on the scope of the project and the research questions being studied. The composition of the sample should be decided according to what the researchers need to know. For example, if the problem for curriculum design is the existence of several generations of technology (latest to the oldest) in use in an occupation, sampling cases must include instances of all generations of technology so that curriculum developers can know the breadth of education required.

Advantages

The strength of exploratory research lies in its focus on the broader picture and on relating the educational needs at the individual level, to an understanding of occupational structure and change. The method's sensitivity to detecting change and the educational implications of change is of great advantage in preventing the problem of preparing a course which is obsolete by the time it is implemented.

Disadvantages

The method requires flexibility in implementation and places a premium on the ability to synthesise (join data) and to extrapolate (look beyond data). Since the usual data collection is by interview, skill is required in conducting relatively open and free-ranging interviews and analysing responses for main themes whilst remaining alert for cracks or flaws in the emerging data which should be followed up as leads for further exploration.

Cost and duration

This is difficult to quantify since exploratory research should sample enough 'typical applications' of the work in the occupation, to provide an overall picture of how the occupation is organised (structured) and how it is changing. Deciding the minimum but adequate number of sample cases depends on the complexity of the occupation. Experience in TAFE applications on small, relatively homogeneous occupations suggests that the number of sample cases for focussed interview and observation of work functions can be set at a minimum of 4-8. Once the broad picture has been obtained, the time required for curriculum development depends on the level of knowledge held by the syllabus writers.

The Delphi Technique

Uses

To obtain consensus from a group of 'experts' about the likely pattern of future events and to show where these experts disagree.

Data collection method

A series of questionnaires are sent to the 'expert' panel. Their responses are summarised and returned to the panel until patterns of agreement and disagreement become clear. Usually two or three rounds of questionnaire administration and analysis are sufficient. The method can also be used during a conference, e.g. where a questionnaire is written during the conference, administered, analysed and the pooled results returned to the group for rating or comment.

Sample

People who are in a position to comment on likely future trends. Thirty or more respondents.

Advantages claimed

The method accesses people without requiring them to meet in person, saving travel time and cost. It describes what key decision makers believe is technologically possible given particular constraints. It gives participants equal

opportunities to set down their perceptions of future events. It eliminates those psychological barriers to communication that can affect face-to-face group interaction. Participants have time for thinking and reflection before giving final judgments.

Disadvantages

The method assumes that the achievement of consensus within the panel, renders the data more believable and that the anonymous responses are more likely to be more objective than those generated through face-to-face group processes. The method may under or over-estimate the likelihood of future developments within an industry because individual desires may become imposed on the forecasting process. Cross impact between specific forecasts can be difficult to assess.

Applications

The method is a promising means for assessing the directions which experts (or informed observers) believe an industry or social process (e.g. education) will take. Such directions could include what technological innovations from the range available are likely to be taken up, and in what time frame. Such information cannot, of course, be proven. However, the ability of Delphi to detect patterns of change likely in the short term (1 to 5 years) could reduce the problem of curriculum obsolescence. Delphi can also be used to scan the 'here and now' and identify consensus on what are the matters of concern and the most promising solutions.

Due to the dangers in forecasting, it would appear sound practice to join Delphi to a method which addresses the 'here and now' of work performed in an occupation. Because it accesses acknowledged experts, Delphi would work best in curriculum development for areas undergoing rapid change, when no one knows the shape of things to come. It would also be a useful component of a multiple method approach to rethinking a problem, e.g. the nature of trade training in the late 1980s, or examining approaches to distance education.

The DACUM method

Uses

To systematically develop a training program incorporating all aspects of the

curriculum (syllabus, assessment and teaching resources) based upon the compilation of a detailed task analysis (identification of job competencies) from the view of 'experts' via a structured group process.

Data collection method

Data on job competencies (duties, tasks, task elements) are collected from a panel of selected 'experts' in the occupational area being studied. In a structured workshop session managed by a skillful facilitator, the panel of experts is asked to define the occupational area in increasingly finer detail. Job categories are identified, followed by the major duties, component tasks and finally the skills, knowledge and attitudes related to the component tasks.

The data are provided by the experts and recorded by the facilitator on cards or butcher's paper until all job competencies have been analysed and are presented in a DACUM chart which becomes the basis for curriculum development.

Sample

The DACUM workshop traditionally operates with about 6-14 experts, i.e. people who are actually performing or supervising the job under study. Participants in the workshop should be representative of different skill strata within the occupational group.

Advantages claimed

The method appears to be quick and easy to manage. It is fairly structured and business like and seems to have appeal to industry experts. It focuses on what the practitioner needs to be able to do on the job. The method is systematic and embraces the training model used extensively by the US Armed Forces. As such it readily suits the established philosophies of many curriculum researchers in TAFE in Australia and provides ordered data which are conducive to full scale curriculum development activities where an entire instructional system is required.

Disadvantages

It has been argued that an instructional systems (such as DACUM) approach to training (objectives model) is too narrow and too inflexible to research

effectively the learning requirements of adult students, because it focuses on an analysis of the job, rather than the learning styles of students. DACUM falls into this category.

Since DACUM draws data solely from industry experts, it has been argued that a DACUM derived curriculum may be poorly implemented by teachers. That is to say, because teachers and students are not a part of the analysis and design process, they are not as committed to the curriculum when it is being implemented. To try to overcome this weakness, some TAFE versions of DACUM include teachers in the workshop process. Another weakness is that DACUM does not identify how an occupation is changing, though it is possible to add a concluding phase examining 'future trends'.

Applications

The DACUM method appears to be particularly suitable to researching occupational needs in established vocational areas i.e. for reviewing or revising existing TAFE programs. This is the case because the DACUM process begins with the identification of job classifications and from there systematically analyses the tasks involved in performance in the job.

It is further argued by some commentators that DACUM works best when applied to an occupational area which is comprised of a fairly homogeneous workforce. It would appear other more search-oriented methods could be more effective in exploring an occupational area or community need where no educational provision (course) already exists.

The Search Conference Method

Uses

The main uses of this method to date have been organisational development, i.e. setting directions for improving organisational responsiveness to clients. In an educational context, the procedure, in essence, aims to assist people to make effective decisions now by clarifying what educational program they want to deliver in the future, taking account of likely future trends, and current constraints.

Data collection method

The Search Conference method is a flexible program containing a number of optional stages following the first step which is a 'FUTURE SCAN' of forces which are shaping the future environment. The 'FUTURE SCAN' which focuses on events, trends or forces which are perceived to be shaping the future, may include segments in which the conference considers the 'MOST DESIRABLE' and 'MOST PROBABLE' futures. The central principle underlying the Search Conference method is that plans made in response to a turbulent environment grow out of

(i) shared ideals or values about what are the important goals of planning for the future of the system in question

(ii) consideration of the constraints which must be taken into account in realistic planning.

Next, the workshop breaks into small groups which take the product of the 'FUTURE SCAN' and the 'MOST DESIRABLE' and the 'MOST PROBABLE' future. Or, depending on the situation, the whole group may select 6-10 changes they judge as important and spell out their likely effects taking into account 'CONSTRAINTS' and what to do about them. In some cases, the conference may examine the effects of changes or trends occurring inside the school or college ('INTERNAL SCAN') which are shaping its future. Another optional step, recommended in curriculum research applications, is the 'HISTORICAL RECONSTRUCTION' - a rewinding of the clock to 'see where we have come from?', in order to see what is good and should be preserved. The next step, consideration of present 'STRENGTHS AND WEAKNESSES' is to take stock of 'what we are good at' and 'what we are poor at?' By this time most of the key issues and options will have been identified and three steps remain:

(a) ISSUES AND PRIORITIES: Placing priorities on the issues identified during the conference.

(b) ACTION PLANNING: Selection of issues and the development of action plans by small groups.

(c) FINAL SESSION: Report-back sessions on the action plans which have been formulated and discussion of implementation procedures.

It is usual for the action groups to continue their work after the conference

ends and these groups may meet again or report to each other through a coordinator.

Sample

The essential requirement is representation of major 'stakeholders' (interested parties). In curriculum research applications these would include representatives of the occupational grouping, teachers, students, curriculum developers and other key decision-makers in relation to curriculum implementation. Sample size around 30 is ideal but Search Conferences can be run with as many as 150 people.

Advantages claimed

The method provides 'future-oriented' data from which to design a curriculum. This is particularly important in design of vocational curricula for occupational areas undergoing change. The process tends to 'open the horizons' of participants ('FUTURE SCAN' leading to 'DESIRABLE FUTURES'), while keeping a firm footing in relation to implementation realities ('CONSTRAINTS'). Because of the representation of 'stakeholders' in the conference and their involvement in the research and action planning stages, the method is said to offer enhanced prospects of implementation of outcomes.

Disadvantages

As yet we do not know how effective is the method in analysing the detail of competencies required to perform work in an occupational grouping.

To effectively apply the method the facilitator requires a good understanding of how to work with a group in an exploration of the wider contextual forces impinging upon an occupational grouping. Moreover, each Search Conference must be tailored to the particular situation. This requires a detailed understanding of the method.

Applications

The ideal application is on an occupational grouping undergoing change. The method appears particularly suited to answering the broad questions in curriculum design such as course philosophy/rationale, aims, scope and course structure and can, it is said, be applied to trade and technician courses, as

well as short courses and organisational and personal development projects. The method has utility in circumstances where there are diverse views about what changes, if any, should take place in a curriculum.

Nominal Group Technique (NGT)

Uses

- To define a problem.
- To generate solutions.
- To establish priorities for action.

Data collection method

The Nominal Group Technique (NGT) requires a small group who meet in a 'brainstorming' session. The process begins with individuals silently writing ideas. These are then listed, one from each member in turn, on large sheets of paper. The ideas are 'collapsed' to remove overlaps, if needed. The list of items is ranked to establish group consensus as to priorities. Any additions are made, then the list is subjected to a final vote. The process is structured to limit group discussion in the idea-generating phase (silent writing of ideas) and the listing of these ideas (by limiting discussion to clarification only).

Sample

NGT appears to work best with groups of 8-10 people (several groups can be run concurrently). Participants can be those in a position to possess expert or up-to-date knowledge of the area and/or those who will be required to implement the (group) decision.

Advantages claimed

The method appears to be especially effective when the participants are strongly motivated to attempt the task (define the problem, or solve a known problem) and can tolerate the rules of the method, e.g. the rule of 'no discussion except for clarification.' The method claims to encourage equal participation and reduce the effects of one or two participants dominating the session. Moreover, because the method uses different procedures in the idea-generation and idea evaluation phases, it is claimed that the method improves both the speed of generation of ideas and the quality of their

evaluation. The method also gives a numerical weighting to the output and so can show what facets of the problem are seen as central, or what solutions seem most promising.

Disadvantages

A key to the method is the framing of the NGT question which focuses the group's efforts. The NGT question can be specific, e.g. 'What subjects in this trade course should be reviewed?' or broad, e.g. 'What will the plastics worker of the 1980s be required to know?' But, unless the NGT question is appropriate, the process can be impaired. Some experience is needed, it appears, in formulating an NGT question which is effective, central to the issue being addressed and one that participants can relate to and understand. The level of abstraction (generality) involved in answering an NGT question may need to be specified. The method may be less suitable for occasions when sharing and evaluating information, in open discussion, are important in both generating solutions and setting the groundwork for smooth implementation. The method can generate frustration if applied in an insensitive, excessively rule-guided way to a group who really need to talk out a problem as a prelude to tackling it in a systematic manner.

Force Field Analysis

Uses

To generate strategies for implementing change situations by identifying the forces, both negative and positive that are retarding change.

Data collection method

For each problem area or concern, the forces which might help in solving the problem are listed opposite the forces which might hinder the problem-solution process. The 'helping' and 'hindering' forces are then ranked from most to least important. After goals have been decided, action can be taken to either strengthen 'helping' forces or to weaken hindering forces, or both.

Advantages/disadvantages

To our knowledge the technique has not been used in curriculum

development in TAFE. The method, in analysing change situations, has the advantages of offering a systematic approach to problem solution by teasing out the helping/hindering forces and identifying the points at which change should be applied. It therefore provides the strategy for change, e.g. strengthen specific helping forces, weaken specific hindering forces.

While not a curriculum research method in the formal sense, it does appear to offer a useful technique, if used following an NGT which identifies the problem areas, to tease apart the helping/hindering forces which bear on the identified problem. In this application, the method would have the advantage over a solution-generating form of NGT (as distinct from a problem-identifying form) of providing greater opportunities for the group to share and interact on perceptions and ideas, whilst retaining the 'hitch-hiking' (building on the ideas of others) advantages of NGT.

Sample

Groups of 4-8 persons.

Applications

NGT is mainly a tool for providing directions in situations of complexity and resistance to change, e.g. a planning group wishing to foster the uptake of an innovation (technical or educational) might use the method to analyse implementation difficulties and adopt a strategy for change. Similarly, a group wishing to introduce a needed change might use the method to show where effort (leverage) might be applied to best effect.

Critical Incident Technique

Uses

To obtain a description of behaviours (completed action sequences) that are 'critical', in terms of either success or failure, to the performance of a task or critical gaps in knowledge, i.e. 'never do X whey Y is happening.'

Data collection method

'Critical incidents' data can be collected by observers (e.g. researchers, supervisors) or the job holder. Data can include: what led up to the incident;

what actions were effective (or ineffective); perceived consequences of the action; and whether the consequences were within the control of the job holder. Collection procedures can include recall, observation, interviews or questionnaires.

Sample

Job holders.

Sample size

This depends on the problem but sample size can be reduced through stratification with fewer cases treated in greater detail.

Advantages

Since the data are observable behaviour, the technique is said to maximise objectivity while reducing subjective components of inference and interpretation. That is, the method draws out factual information of the 'how to/how not to' type, rather than the 'I think ...' type.

Applications

The technique is suitable for eliciting practical information about working with equipment, processes or people. It can be used to decide weights of emphasis in curriculum design and assessment decisions (what content is 'critical'). It has wide application in studying social skills needed in technical and further education.

The concept of 'critical incidents' (i.e. do's and dont's) can be used in other research methods, e.g. an NGT focused on a part of the work of an occupation. In student questionnaires, questions can be asked on (1) what aspects of the course were critical and positive in helping the student to perform key task sequences successfully, or (2) what parts of the course were irrelevant, or (3) what task were you required to do but were unprepared for? This information would, of course, need to be set into perspective by analysis of the student's background such as type of work performed by employer. Critical incidents collected across a pool of respondents could be the basis of an industry or student questionnaire.

Duration and cost

As yet, there are no case study applications in TAFE of this method. The method can, however, be time consuming in data collection and analysis but appears worthwhile in terms of the practical relevance of the data to successful work performance.

CHAPTER 2

SEARCHING

2.1 EXPLORATORY (QUALITATIVE) METHODS

Introduction

A central problem in curriculum design in TAFE is to decide what should be the broad thrust of a program: the aims, main content areas, weights of emphasis to be placed on subjects and course structure (subject sequencing). Some research procedures, especially those which gather detail about tasks performed (task lists or inventories) provide the base data on work functions and tasks performed, but usually do not provide, from the research itself, guidelines as to how this data will be organised into a finished curriculum. The problem of translating occupational data into a curriculum is described next.

In attempting to explain the problem of deciding what to include or exclude from a course, we will use the analogy of the 'line of best-fit' used in statistical regression analysis. Just as regression analysis seeks to plot a line of best fit through a pattern of information (a scatter of data points), so too, does curriculum development seek to find a best-fit pathway which embraces specific information such as the main work functions or the tasks performed in the occupation (i.e. data which describe what is done) or competencies required for work in an occupation (i.e. data which interpret work functions in terms of knowledge and skills required for effective job performance). The analogy is depicted graphically in Figure 2.1 below, which represents the field of knowledge required within an occupation as circles which, for purposes of illustration, have been labelled 'concept-skill clusters', i.e. the concepts (theory knowledge or knowledge 'how') which guide the practical skills (knowledge 'what') needed to execute a task. In Figure 2.1 these concept-skill clusters have been positioned, arbitrarily, according to two dimensions: breadth of coverage and complexity. The 'pathway of best fit' in Figure 2.1, represents what is to be included in a course.

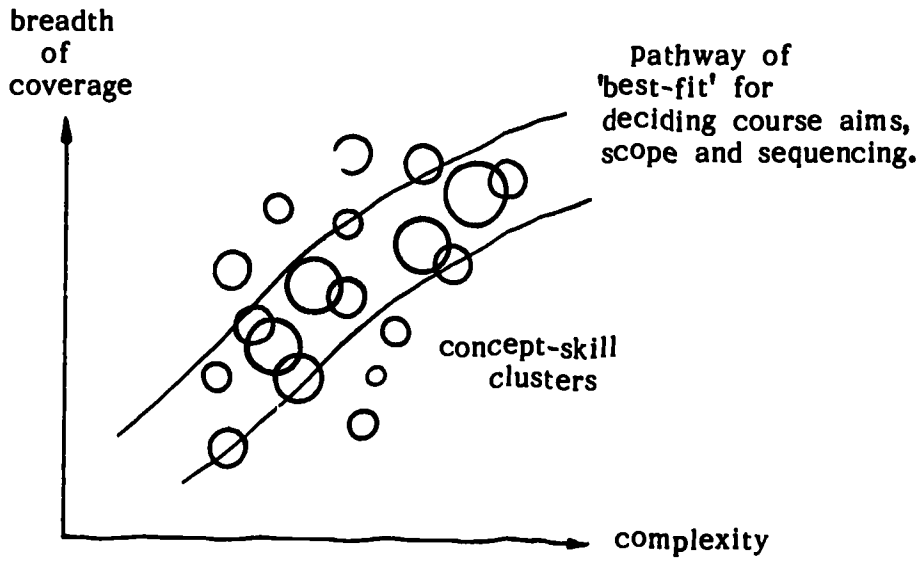


Fig.2.1 Representation of curriculum content decisions as a 'best-fit' pathway through a subset of the total knowledge within an occupation

Curriculum development which works from the ground up by attempting to organise a mass of detail about tasks, sub-tasks, and the like, into course aims, structure and content, often leaves the placement of the pathway through the total field of knowledge to the data analysis and curriculum design stages. Where such decisions take place without benefit of research-based guides as to how the 'base data' will be structured into a course, the decisions about course aims, structure and content become subjective (based on personal opinion or 'hidden agendas') and on arguments of the kind: 'you have to put this in the course ... you can't teach this without that'. In other words the decisions are subject to personal opinion. Such comments may be sound but how can this be known from a research basis? An answer to the subjectivity problem when translating 'base data' into course aims, appears to lie in blending ground-up methods which give basic detail on work functions, with overview-down methods which explore the larger questions of occupational structure and change in order to decide the main elements of course aims, content and structure. This theme, the need to understand how work in an occupation is structured and is changing in order to guide decisions about course aims, scope and subject sequencing (finding the pathway of best fit) will now be taken up by discussing some of the key concepts which underpin exploratory research.

Key concepts in exploratory research

The aim of exploratory research in vocational and further education is to achieve an understanding of the main features of the occupation or activity being studied with a view to deciding the larger questions of curriculum design: course aims, course structure and how course content is to be organised.

Sampling methods which might be used during exploratory research include 'snowball' sampling, used when the researcher is circling around in information networks - literally like a snowball gathering size as it moves, and 'typical applications' sampling - the selection of cases to provide a cross-section of typical applications of work, equipment and processes used. This type of sampling is sometimes married to matrix sampling where representative types might form one dimension of the matrix and hierarchical levels within the work place might form the other dimension.

The thrust of exploratory research is, therefore, to provide insights into the following:

- Scope of the program;
- Weights of emphasis to be given to segments of the program;
- Depth of coverage within segments;
- The order in which subjects or units should be sequenced so that students will acquire usable skills (as defined within the occupation) or marketable skills (to secure a place within an occupation, or gain promotion), which are appropriate to the stage of education (e.g. first, second, third year or advanced).

Good exploratory research begins with good research questions. A research question describes your aims in the research phase: what you want to find out. Research questions which guide exploratory research are usually purposely defined in broad terms since their aim is to provide the overall picture, not the minutiae of task elements. Research questions are usually divided into finer questions (e.g. as in an exploratory interview) and are used as the researcher's organising perspectives, guiding and focusing the data search and data interpretation stages. Some examples of research questions are:

- What gaps exist in educational provision within an occupation (which could be filled by TAFE course X)?

- In what ways is technological change altering the pattern of work skills in the occupation?

- How is the occupation structured from the point of view of designing relevant curriculum? What career paths are open? What does a student need to know to enter the occupation? What knowledge is required at more advanced levels? What upward or sideways career paths are open?

- What should be the central (broad) outcomes of the level of course being designed/reviewed?

- What constraints exist within TAFE which might pose program implementation difficulties?

Research questions used in occupational research should ideally span the individual level (educational outcomes) and the occupational/social context level (the wider forces which shape immediate knowledge needs or future needs which the educational program should anticipate). In moving back and forth between these two perspectives (individual and occupational/social context), exploratory research seeks to relate student needs to an understanding of the way in which work in an occupation is organised, or is likely to be organised by the time graduates will enter the occupation. Exploratory research therefore borrows from psychological (individual) and sociological (wider social context) perspectives. The attention given to the sociological or wider perspective ensures that exploratory research produces the necessary broad picture of how work in an occupation is organised.

One method of examining the way an occupation is structured is to look, in broad terms, at the kinds of work functions which employees are required to perform upon entry to the occupation and then to trace likely career paths (sideways or upward) in order to assess the goals (outcomes) of a broad-based educational program. However, looking at the way an occupation is arranged in terms of existing work functions can miss important changes which are beginning to take place within an occupation, e.g due to the uptake of new technologies. New technologies 'de-skill' by replacing old skills with a technological innovation. However, in this process, a demand for new skills is created.

The aim of exploratory research is to detect patterns or common themes

(e.g. emerging skill requirements) but also to look for 'disconfirming instances' which may imply that the emerging pattern does not tell the full story. Good exploratory research, therefore, looks for cracks or flaws (disjunctures) in the emerging data pattern. These disjunctures then become leads for further exploration.

For example, exploratory research into occupational educational need in a TAFE Post-Trade course (Anderson, 1985) showed the patterns of knowledge required for effective, advanced level job performance but revealed a disjuncture (flaw); the industry did not believe that TAFE could deliver an effective educational program because TAFE lacked high technology equipment. The school rectified the equipment problem before seeking accreditation of the course, avoiding an initial failure which would have jeopardised the future of the course. This example demonstrates how exploratory research can generate an important understanding of how initial appearances, in this case a clear view of the patterns in educational need, can mask vital information, in this case doubt within industry that TAFE could deliver proper training. This problem, the 'pattern level' of the data obscuring vital disconfirming information, is also present wherever consensus is used as the main argument for a particular line of action, a point which has relevance to a number of the curriculum research methods described in later sections, which seek to establish, by various and sometimes subtle means, consensus about curriculum content and aims. This issue is taken up again in Chapter 4.

Exploratory research can be very productive in a short time, especially if based on good research questions applied in probing interviews with informed personnel and observation of work performed. A useful sampling strategy is to select 'typical applications' of work in an occupation which provides a cross-sectional view of the occupation according to sampling criteria which evolve as knowledge of the occupational area expands during the research. That is, the sampling cases and the research questions are reviewed and expanded as needed during data collection. This is in contrast to the 'classical' approach to research which takes a straight line (linear) form: 1. Literature search. 2. Hypothesis formulation. 3. Data collection to test hypotheses.

The aim of exploratory research is to achieve an understanding of the occupation/social context at the broad level. The only hypothesis in exploratory research may be the hypothesis that, if the right questions can be

found, the answers will follow. Another example: A short exploratory research project was conducted which examined knowledge needs in an occupation affected by technological change (Anderson, 1985). Since technological change was known to be a key factor, a 'typical applications' sample (n = 4) was selected for the exploratory phase which reflected technological uptake at four levels (1 case per level), extending from 'high use of technology' through to 'mainly old technology'. This sampling strategy was intended to throw light on a problem often encountered in TAFE curriculum development projects: the need to know what older generations of equipment are still in use, in order to decide the scope of the educational provision.

In exploratory research, sampling is continued until an adequate cross-sectional view of an occupation is obtained. In the project mentioned above, the sampling was terminated at the four cases because: (1) The four cases provided an adequate cross-sectional view in the eyes of the research team and the sampling categories were confirmed by respondents as covering the main ways in which the occupation was divided. Had confirmation of the logic behind the sample not been obtained, additional cases would have been added to obtain a cross-section and the process of adding cases would be continued until the data began to be repetitious. This demonstrates a principle in exploratory research: the exploration should continue until an adequate impression is obtained of the phenomenon under study, sacrificing detail rather than breadth, if resources are limited. (2) The intention was to use the results of the exploratory research to design a questionnaire to be administered to a 20 percent random sample of the occupation to amplify the impressions of the exploratory phase.

While exploratory research can provide qualitative information sufficient for course development to proceed, for this to be successful either the syllabus writers must have a good technical grasp of the area and/or be able to draw upon existing materials such as technical manuals or other publications for detail once the overall aims/outcomes are known. Exploratory research (including the yield from preliminary investigation) provides an excellent basis for designing a questionnaire because it can provide a set of major questions which can be explored in the questionnaire in more detail. Insights about the way that duties are arranged in an occupation, or insights about the forces for change acting within or upon an occupation can be quantified and these then used to sort responses to specific knowledge and skills questions according to

occupational structural characteristics. The questionnaire results can show differences between knowledge/skills for, say high technology firms versus older generation technology firms.

A considerable body of knowledge has been developed about how to build a course from the ground up using a variety of questionnaire methods which obtain very detailed information about job tasks. (See Gael, 1983, on use of the Work Performance Survey System [WPSS]; Banks et al. 1983 - Job Components Inventory [JCI]; Youngman, 1978 - Position Analysis Questionnaire [PAQ] and Goode, 1981 - Comprehensive Data Analysis Program [CODAP] to mention a few). Approaches which work upward from detail about work functions to course structure and aims, invariably fall short in providing information about broader educational needs of students such as learning how to learn in order to obtain a sufficient breadth of knowledge to facilitate career mobility.

The strength of good exploratory research lies in its potential to pick out the broader dimensions which will affect curriculum design: to work from the top down, from the general to the specific, by identifying the broader outcomes for educational provision. For example, an exploratory investigation of short courses for Graphic Arts camera operators (in NSW) showed that the ability to work unsupervised was a central requirement of employers. This became the central goal of the course provision and was written into the course aims.

In the conduct of exploratory research and indeed, research in general, care needs to be taken when looking for patterns, to look also for any flaws (disconfirming data) which should be followed up with further exploration.

Good exploratory research is something of an art form. Its aim is to explore the dimensions of the subject matter being investigated, both to inform the researcher of the questions which need to be asked and to obtain data about the industry being studied, which will have a direct application to the curriculum to be developed, especially at the level of course structure, aims and main content. Exploratory research involves being in the right place at the right time, with the right question and places a premium on the knack of being able to synthesise (join data), yet make leaps (look beyond data). It needs interpersonal skills to engage people in co-operative efforts, to 'keep the

information coming', yet to avoid being deceived by initial appearances (patterns). It is a form of research which sweeps from the individual to the wider occupational/social context and involves a continual process of probing, questioning and reflection.

Exploratory research requires the ability to engage 'key informants' (people with either broad knowledge or limited though detailed knowledge of the area under investigation) in open-ended discussions which explore a set of research questions; adding more questions, if needed, until an understanding sufficient to decide the broad thrust of the course (structure, aims, main content) is obtained.

Exploratory work, though at times difficult to quantify, can be used to focus quantitative methods on those areas where such methods appear to work best. Moreover, it can be useful in setting the results from quantitative research into a wider context e.g. by relating fine-grained detail on tasks and competencies, to an understanding of occupational structure and change. Since public education invariably lags behind the emergence of new skills, it is possible, for those industries or services which are undergoing dramatic change, that a good blend of qualitative and quantitative data, obtained and used quickly, could lead to the development of an educational program which contributes to the design of the job itself, rather than merely reacting to an existing design.

In summary, the aims of exploratory research are:

(a) To obtain 'broad-brush' insights into questions of scope, weights of emphasis (where is breadth of coverage and where is depth of coverage likely to be important) and sequencing of learning (what needs to be placed early in a program given two requirements: The needs of the occupation, and of the needs, in knowledge acquisition, for certain concepts/skills to be acquired before others. For example, problem-solving skill is knowledge based: certain knowledge must be acquired before problem-solving skills can materialise).

(b) To obtain an understanding of how work in an occupation is organised and the ways in which this may change in the near and distant future.

(c) To obtain an understanding of what a student may need in relation to the motivation for self-training and life-long learning.

We have presented an approach to conducting exploratory research using a sample of 'typical' firms to give a cross-sectional view of work in an occupation, using focused interviews plus observation of work done. The principles of this method can also be applied to the study of skill masters (see Appendix C).

2.2 THE SEARCH CONFERENCE TECHNIQUE

2.2.1 Background to the Search Conference technique

The Search Conference has been used widely both overseas and in Australia in the government and private sector as a tool to achieve participatory problem solving or planning. In the educational domain, Search Conference techniques have not yet been widely used for curriculum design and review, but for identifying educational issues, establishing educational policy and priorities and developing plans for solving educational problems.

The Search Conference has promise for undertaking curriculum research activities. Advantages claimed for the method are:

- Involvement of all appropriate stakeholders in the search process.
- Capacity to generate commitment to the search outcomes and consequent enhanced prospects of implementation.
- Futures (or forward-looking) orientation of the process which seems to be particularly suitable for the planning of vocational educational programs.
- Philosophical consistency with androgogy (the education of adults) and the reliance of the Search Conference on the traditions of 'action research' as distinct from pedagogy.
- Attention to the values, beliefs and power relationships of the participants and the educational decision-making environment (Crombie, 1985).

2.2.2. The philosophy of the Search Conference

The Search Conference is a planning process based on a perception of the world as comprising a turbulent environment - one in which at any particular time, people and institutions have goals, but that these goals will undergo frequent changes. The method assumes that the values and beliefs of people

are less changeable. As a method of participatory planning therefore, 'search' is a method which begins the process of generating action plans by engaging participants in an exchange of values and beliefs.

Crombie (1985) presents a view of the Search Conference within the tradition and framework of 'action research' and from the point of view of an adult educator. The Search Conference, viewed from this perspective, appears to be particularly suitable to curriculum research undertakings in TAFE.

The Search Conference is a process built upon an acknowledgement of a number of requirements for achieving effective social change and development, including the willing participation of members of the social system undergoing change, leadership of the change process, and relevant expertise for the framing of choices (Crombie, 1985). Because of this the Search Conference contrasts favourably with some of the traditional 'expert' based approaches often used in TAFE curriculum decision making. For these reasons it is claimed, 'search' affords a greater potential for generating commitment to outcomes and enhanced prospects of implementation (e.g. by teachers).

As a tool for the achievement of social change and development, the search methodology is designed to generate co-operative group activity aimed at: finding solutions to practical problems, contributing to the body of knowledge on the area under focus, and being a learning process for the participants.

Crombie (1985) identifies the Search Conference process, with its attention to values, beliefs and power relationships, as a political process. As such, he urges search group leaders to be clear about their own values and to accept responsibility for communicating these values to others. It is evident therefore that people's values - both the participants and leaders - or rather the exposition of these values by individuals and the exchange of value perceptions in the group process, is a cornerstone of the search philosophy. The 'past-present-future' framework for expressing and exchanging values and views of desirable futures by participants reflects the forward-moving (planning ahead) and divergent thinking characteristic of the Search Conference method. It is not a method which relies upon the common preference for focusing on the here and now, the known, or the objective, but is one that encourages the opening up of new horizons which can then of course be assessed in terms of present constraints.

2.2.3 An overview of the Search Conference method

According to Crombie (1985) the Search Conference is a methodology for participatory planning. It is a systematically structured and managed process whereby groups can search future possible environments for a more desirable future for themselves, and generate a strategy for achieving it. It is a purposeful but realistic process, in which 'desirable' futures are identified on the basis of an exploration of shared human values, and weighed against an evaluation of the past, and an assessment of present constraints and opportunities. In its basic structure the process moves from the generation of information and ideas (brainstorming - divergent and lateral thinking), through synthesis and analysis of these (evaluating and priority setting), towards action planning.

The Search Conference begins and ends with plenary (whole group) sessions, the structure and purposes of which can be reasonably well determined beforehand. The initial plenary session must both begin to build group cohesion, and embark upon the task which is usually described in general terms, e.g. 'Welcome to this Search Conference on future directions for ...' This is likely to entail:

- Breaking into small 'buzz groups' of three or four people in order to introduce one another, to investigate the resources in the group, and to clarify perceptions of the task.
- A briefing on the task and the proposed overall structure of the conference from the group facilitator.
- An initial brainstorming session on the forces that are shaping the future environment. In some cases this session may be addressed to the past rather than to the future - 'where have we come from?'

The material generated in these and all subsequent sessions is recorded on flip charts or butchers paper, which will comprise the raw material for the final report.

The final plenary session is for reporting from small groups on priorities and strategies, and for collective action planning - who is to do what, when, with what resources? This usually includes the selection of some sort of steering group to finalise and distribute the report.

Aside from these two basic elements, the structure of each Search Conference (refer to Figure 2.1) is likely to vary somewhat according to the task and the practitioner. There are, however, a number of common or typical steps and it is possible to characterise these, though not to assign them to any particular order:

FUTURE SCAN

Brainstorming session in plenary session to generate data and value perspectives on the trends, forces, events that are shaping the future environment.

DESIRABLE AND PROBABLE FUTURES

The product of the FUTURE SCAN is taken as a starting point by small groups, formulating from it the most desirable future and the most probable.

PRIORITIZING

As an alternative to the above, the group may be asked to identify the 6-10 trends or changes that they consider will be of most importance, and to spell out the influences that can be expected.

INTERNAL SCAN

In some cases it might be appropriate to run a brainstorming session in the plenary session on changes and trends that are occurring inside the organisation or school or college and shaping its future.

HISTORICAL RECONSTRUCTION

In some cases a rewinding of the clock to see 'where have we come from?' can be useful. This leads naturally to a consideration of what should be preserved, and what should be modified or dropped.

STRENGTHS AND WEAKNESSES

This can be an alternative to, or extension of, the INTERNAL SCAN. Its function is a stocktaking of the present situation in terms of 'what are we good at?'

ISSUES AND PRIORITIES

While most of the key issues and options will have been identified in one or other of the preceding sessions the task here is to consolidate the issues that confront the group, and place priorities on them.

ACTION PLANNING

Small groups select priority issues to develop action plans for reporting back to the final plenary session as key recommendations of the conference.

FINAL PLENARY SESSION

Final report on action plans, and consolidation of these. Discussion of implementation procedures.

In the simplest terms, a Search Conference aims to assist people towards effective decisions and actions to be taken now, by clarifying where or what they want to be in the future, and taking account of the claims of the past.

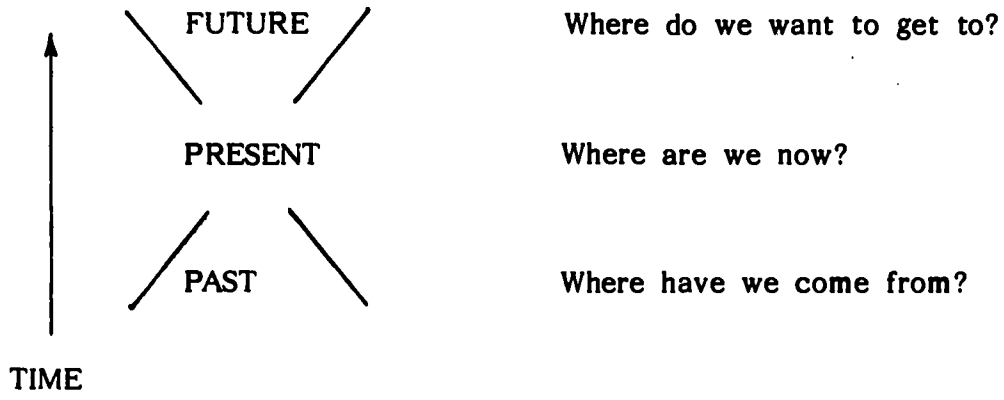


Figure 2.1 Basic elements of a Search Conference

2.2.4 Planning and conducting a Search Conference

The following guidelines have been identified by some search practitioners as a useful aid to the planning and conduct of effective conferences.

Conference venue

An appropriate conference (workshop) venue should:

- be accessible to participants
- have overnight accommodation facilities if required
- have adequate parking facilities
- have wall space for attaching butcher's paper sheets
- have sufficient chairs and tables
- preferably comprise one large room
- have a separate area for refreshments
- be private and relatively free of outside noise.

The venue should be inspected to check its suitability.

Selection of participants

Participants should be chosen carefully and with due courtesy and protocol by considering:

- who are the stakeholders in the matter to be searched
- can the number of participants be contained within the range of 15-35 (ideally)?
- what is the conference (workshop) about?
- why hold a Search Conference rather than using some other strategy?
- do the likely participants have relevant experience, knowledge and interest?
- can a sense of commitment be anticipated from each participant?
- what should be the balance of stakeholders within the selected group (e.g. teachers, industry representatives, practitioners, students, administrators)? Establishing the correct balance of stakeholders is vital to the success of the outcome.

Participants should be telephoned and their attendance confirmed by letter.

Preliminary contact with participants

In preparing for a Search Conference it is important to spend up to two weeks (for 30 participants) in attending to the following preliminary activities.

Major stakeholders should be interviewed (whether they are participating or not) to: identify the issues that are likely to arise in the workshop; identify the circumstances of the present situation (e.g. what the current curriculum is and how it is delivered); identify what problems and constraints people are aware of; and explain the search workshop process and begin to share values, philosophy and to gain initial commitment to the process.

Conference agenda

The agenda for the workshop should be designed carefully, taking into account the preliminary work described above. Although the search process is basically the same format for each workshop, each agenda should be uniquely determined to suit each group and the problem to be tackled. (Time constraints may require the contraction of two or more steps into one). It may be advisable to convey to participants an indication of timing on each stage of the process, since some participants are particularly time oriented. Ideally, a search workshop will be conducted over a period of between 10 and 20 hours, spread out over two days.

Sample agendas for short Search Conferences ('mini-search conferences spanning an evening and the next day as opposed to the more usual three day format) are provided in Table 2.1 and in Appendix B. The example given in Appendix B shows the final format adopted for a 'mini-search' for the review of the Graphic Reproduction Trade course (Anderson, 1986). The example in Table 2.1 was drawn from a Search Conference conducted by Dr Alastair Crombie in co-operation with the Curriculum Services Directorate of NSW TAFE (now Directorate of Studies). The study was conducted as one of a number of research strategies what were adopted for a review of the NSW TAFE Pastrycooking Trade Course (Brady, 1984). It was attended by 17 participants comprising six industry representatives, one union representative, six TAFE teaching staff, three students (one from each stage of the existing pastrycooking trade course) and one TAFE curriculum development officer.

The Search Conference workshop was facilitated by Dr Crombie as workshop manager - he was assisted by a co-facilitator. Two workshop observers were present. One of the observers recorded the conference on videotape.

The conference was conducted over two days (and one evening session) and lasted for about 12 hours.

Workshop materials

The Search Conference facilitator should be properly prepared and armed with the requisite materials to avoid delays and interruption to the process. Materials might include:

- large sheets of paper (butcher's paper)
- overhead projector and transparency materials
- masking tape
- wall space for affixing the butcher's paper sheets when completed
- appropriate handouts (such as agendas or guides on writing action plans)
- ease's, boards, marking pens, name tags.

Preparation of workshop room

Arrive at the venue early to allow time for preparation including:

- distribution of handouts and name tags
- location of boards, paper, pens
- preparation of refreshment area
- arrangement of furniture and the room to maximise group sharing and group unity. See Figure 2.2.

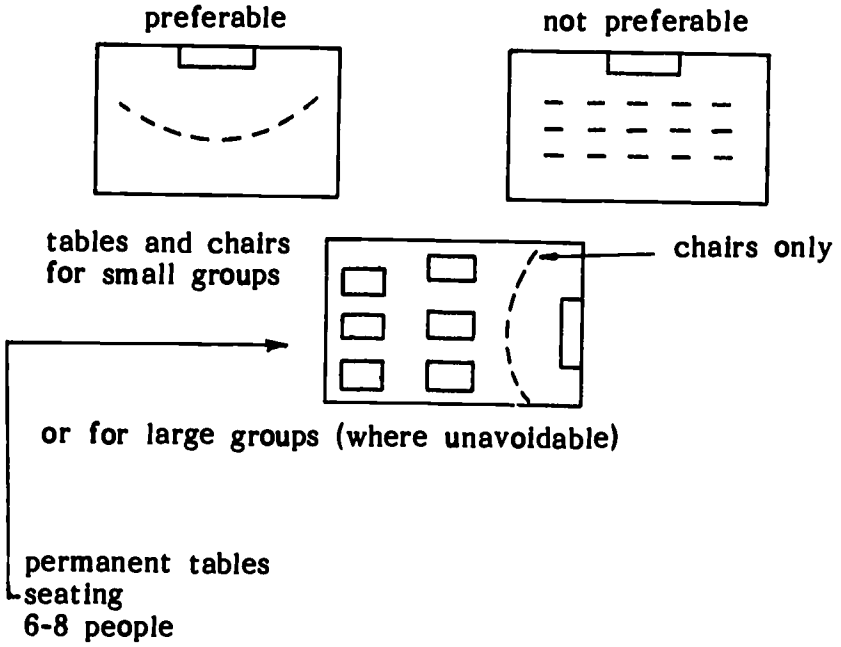


Figure 2.2 Seating arrangement for a Search Conference

/orkshop introduction

The introduction to the workshop should be low-key but efficient. The ollowing points are worthy of note:

- introduce and welcome people as they arrive;
- start on time;
- thank people for attending;
- introduce self and allow for introductions of others;
- explain why workshop is being held and) arranged or authorised it;
- key speakers (of the expert or authority type) should be avoided as they can be counter productive. (If protocol insists that such a person must say something then let it be restricted to a welcome to participants.)

orkshop beginning

The workshop should commence with a recording of participants' expectations butcher's paper. Using one or two scribes as necessary, record answers to

the questions:

- why are you here?
- what do you expect from the workshop? (Include facilitator's expectations but do this as part of the group).

As well, ensure that the group feels comfortable.

When recording expectations:

- do not prolong the activity unduly, but do tolerate some silences;
- do not attempt to qualify or summarise participants' contributions;
- record what is said in full (but use keywords or interpretations if the speaker rambles on);
- once recorded, leave the sheets on the wall and proceed straight on via 'well that's quite a job' or 'O.K. let's get on with it' or such like, in order that the expectation will be that recorded expectations will be met.

Workshop process guide

Explain the role of the facilitator, the agenda and search process, stressing that the search process is based on a philosophy and perception of the world comprising:

- a turbulent social environment;
- goals change frequently, whereas values are more long lasting;
- planning is based on the shared values of the participants not on the views of 'experts';
- be open and honest and encourage the group to be likewise.
- value all opinions equally regardless of status or position. Promote an awareness in the group of the narrowing-in process of the Search Conference which is based on sharing values about: the world or Australia; narrowing to the subsystem under examination, e.g. education -> TAFE -> a particular

TAFE course; narrow to particular problems, issues, constraints; narrow to particular action plans.

A picture of how the Search Conference moves from the general to the particular is given below.

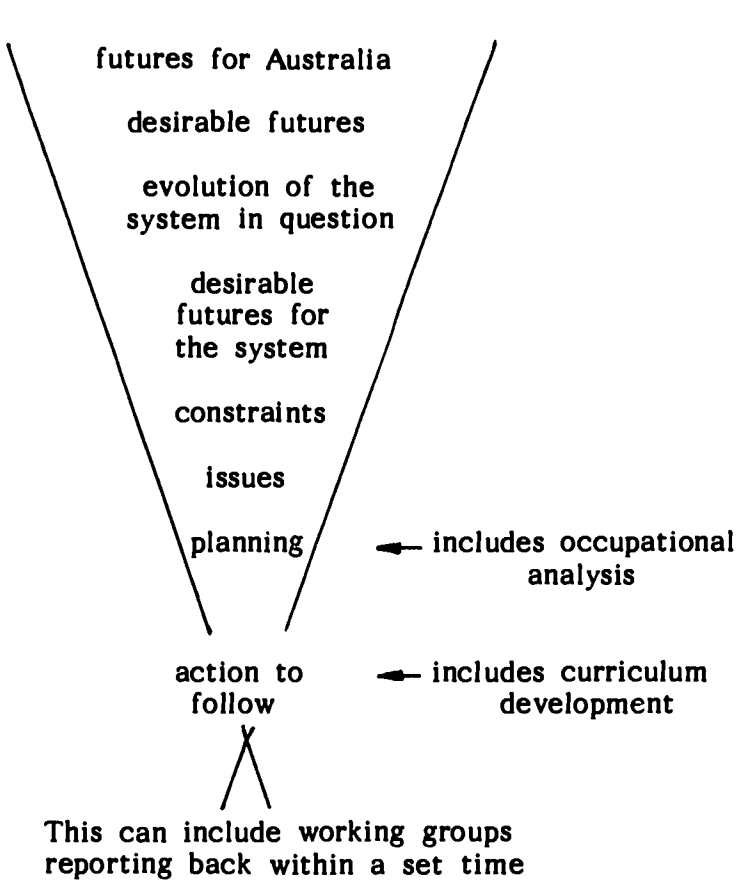


Figure 2.3 The Search Conference process

Stress that the differences between 'search' and traditional planning processes is that the latter often founder when the external social environment changes (MacDonald, 1984). Stress that the facilitator's role is one of attending to the process, not giving answers which is the group's job. When brainstorming (the process of generating ideas in a group setting):

. tolerate silences (but be prepared to break them by prompting a discussion area not yet considered, such as a factor believed to be important in course development for the area;

- be flexible with time limitations;
- encourage ideas to come as fast as they are generated (using two assistants to write them on the sheets of paper, if necessary);
- do not foster argument, except for clarification; rather encourage the opposite viewpoint or a qualification and record that as well;
- check with the speaker (at least by eye contact) that the idea has been recorded accurately;
- hear everything and value all contributions - if one idea out of three coming at once is missed, stop the group and find out what was missed and record it;
- discourage speeches (advise the group that this is a rule) by avoiding eye contact when they occur or looking impatient, but listen carefully nevertheless and record some key words to let the person know the idea is still valued;
- help the participant who is having difficulty in crystallising a thought by being patient, quietening the room, suggesting a key word;
- do not agree or disagree with contributor's views;
- keep the session moving, but be prepared to stop when the group has had enough.

Note that brainstorming is an ice-breaking activity. It can develop group cohesiveness and good humour. Importantly, it introduces ideas which the small groups will consider in depth. It is important to encourage a comprehensive treatment of the topic and record in brief clear wordings.

When examining 'desirable futures' in small groups (6-8 people):

- indicate to participants that this is where the group can work towards an agreed shared set of values;
- try to eliminate any constraints which might limit the range of ideas generated;
- each group should strive for consensus;
- try to devise strategies allowing more time to those small groups who need it;
- ensure each small group has a recorder (scribe) but

not a chairperson;

. the facilitator should not join any group but should 'float' asking probing questions if needed.

During plenary (report-back) sessions after small group sessions:

. restrict questions during report-back - questions or discussion can occur at the end of the report-back session;

. encourage the speaker to refer to the butcher's paper recordings for his/her group;

. encourage speaker to be brief and not dwell on points made by other groups;

. if the small group session was focused on planning, then seek plenary consensus on an issue by issue basis (and be prepared to send groups away to do it again).

Identifying issues

When individual participants are posing personal issues to be considered:

. provide participants with a format guide to writing down their issues so that there is a common format, such as: (1) What is the issue? (2) Why is it important?

. encourage a sense of ongoing commitment.

Whether issues are identified by individuals or small groups, the facilitator should promote group ownership and agreement so it is preferable to allow the plenary group to identify, cluster and prioritize issues. (If preliminary research has identified issues which during the workshop seem to be overlooked by the group, then say so and ask why?)

Setting up planning/action groups

. when forming action groups to undertake work on specific issues

- base the groups on the issues identified and prioritized by the whole group and not on one person's perceptions;

- the composition of the groups should be voluntary;

- expect a firm commitment to ongoing action;

- encourage participants to join action groups where the issue is of concern to them and where they feel they can contribute;

- allow 'floaters' (although in time most participants will settle into just one group).

- when action plans have been prepared by interest groups, gain plenary acceptance of the action plans. Also:

- encourage groups to use a common format for setting out their action plans, e.g. what is the issue, why is it important and how can something be done? (Seek a range of alternative strategies in priority order);

- encourage interest groups to test their plans on other groups or to brainstorm other groups

- when each action group reports back to the plenary session, encourage the assembly to constructively criticise the action plan - if appropriate the group can re-design their action plan, and if necessary ask for the action plan to be re-written.

. At all stages of the workshop, especially at the stage of discussing action plans, it is important for the facilitator to be consistent and to assist participants in being consistent. The facilitator should keep referring back to previous group and plenary reports and point to areas of inconsistency if these exist. The primary role of the facilitator here is to ensure that agreed, shared values from the earlier part of the workshop permeate the action plans that are accepted.

. In planning for the follow-up work of action groups, the groups themselves should be encouraged in the ownership of their plans until the issue (or problem) is resolved or the task is completed. This will almost certainly require further meetings or at least the establishment of some form of network. The facilitator should ensure that the issue is finalised, but should not need to be the prime-mover to achieve this.

Workshop closure

Achieve closure of the workshop by reviewing the expectations of participants stated at the beginning and summarising ongoing action. Thank participants for their contributions. Compile a workshop report and distribute this as soon as possible after the workshop, being sure to include copies of all the butcher's paper sheets and action plans.

2.2.5 Utility of the method to curriculum development in TAFE

This section offers some comments on the usefulness of the Search Conference method in a TAFE curriculum development context. The comments, at this stage, are impressionistic.

Duration of the method. From the point after which preliminary research activities have been completed, a search approach would appear to take up about four working weeks of the organiser's time. This period would account for preparation (two weeks), conduct of workshop (one week) and reporting (one week).

Cost of the method. The major TAFE costs associated with the conduct of a Search Conference would include the work time of the conference organiser (a teacher or curriculum officer) for four weeks; the fee of the outside Search Conference workshop manager, if this expertise is not readily available inside the organisation; the conference work time of participating teachers and other officers; the hiring fee for appropriate conference venue; the costs of provision of meals and refreshments for participants; the costs of travel and accommodation of conference participants; and printing and postage costs associated with preparation and distribution of conference report.

Expertise required to use the method. The most important component of expertise required to use a Search Conference method is the skill and experience of the search workshop manager - the nature of this expertise is more fully covered in Anderson and Jones (1986), The facilitation of curriculum research workshops in TAFE.

The Search Conference organiser (whether a teacher, curriculum officer or administrator) would need to have or be able to draw upon curriculum development expertise. Oftentimes the organiser may choose to work as a co-workshop manager (or co-facilitator) with the specialist workshop manager.

The teaching and industry expertise that would be required in using the method, would generally be provided by the Search Conference participants themselves - from the TAFE teaching area and the industry area for which the search study is being conducted.

Human resources required to use the method. The number and selection of

people to be involved in the use of a Search Conference method is determined largely by the diversity of workshop participants required to adequately represent the views of the key stakeholders in the activity. Typically, the range of people involved might include: a workshop manager, a curriculum officer, between five and ten teachers, two to four students, five to ten industry representatives and between two and four TAFE administrators.

Hardware requirements of the method. As mentioned previously, the material requirements for the conduct of a Search Conference would include the workshop venue comprising one large room with ample wall space and a number of accompanying smaller rooms for small group work, and butcher's paper, writing pans, easels (on which to place two sheets of butcher's paper side by side for writing down the groups comments) and an overhead projector. Other items were listed in the previous section titled 'Workshop materials'.

Capacity for blending the method with other approaches. Because of its relatively short duration, and low cost, the Search Conference method is particularly suitable for use as a part of a broader research strategy. If used in this way, it would seem appropriate to use the search approach during the early part of the overall research phase of a curriculum project. The capacity of the Search Conference for examining the context of a curriculum project and identifying the likely problems to be faced, as well as its 'futures' orientation give it considerable power as a method to be employed as part of a broader research strategy.

Acceptability of the method. Some applications of the method in its short or 'mini-search' form have been made (Brady, 1984; Anderson, 1986). The method does appear to hold promise for setting the broad directions for technical education courses and is well worth trying, especially in situations where major technological change is affecting an industry. It is essential to achieve a full representation of stakeholders to ensure that the data are representative.

The acceptability of the method in a TAFE Authority will depend to some extent on the curriculum research tradition established in that authority. Where curriculum researchers have pursued research styles from the positivist scientific tradition, then there may be some ideological concern about adopting,

even as a component of a research strategy, a method which is as participatory, futures-oriented and qualitative as a Search Conference. Conversely, however, it is not unlikely that TAFE administrators and/or consumers will be keen to employ methods such as search because of the relatively short duration of its execution. Needless to say, TAFE curriculum researchers, in designing research strategies, and conducting research, should be concerned about striking an appropriate balance between elements such as: expediency of the method, reliability/validity of the method, and acceptability of the method.

Notwithstanding these introductory remarks, it appears to the writers that the search method has certain positive attributes:

- it involves teachers in the research process in an active way, hence being conducive to earning commitment by those people who are instrumental in the implementation of the research outcomes;
- it involves all major stakeholders - students, teachers, industry, administrators, etc in the research process in an active way;
- it is cooperative, participative and based on the shared values of participants which are likely to be more enduring than the stated goals of people;
- it is futures-oriented which is particularly suitable to the design of curricula aimed to meet the requirements of people preparing for vocational areas in a changing environment;
- it appears a particularly suitable process for obtaining the kinds of data that would lead curriculum developers to be able to determine an appropriate course philosophy/rationale, course aims and a course structure.

The method seems to have the following drawbacks:

- it has not yet been widely used in TAFE for curriculum projects and as such may be viewed as a radical departure from traditional and entrenched research methods;
- it relies upon the participants' capacity to comprehend the philosophy of the method and once comprehended to embrace this philosophy as a valid rationale for participating in the process and being committed to its outcomes;
- while it appears to be a useful method to adopt as an

initial curriculum research method, it does not possess a mechanism which is a unique aspect of the method itself, for defining the detailed curriculum content/objectives which would ordinarily be the major outcome of a typical TAFE curriculum research activity. For developing detailed curriculum content/objectives, it is likely that an additional research and/or analysis step would need to be used as an adjunct to the method. In Chapter 6 we suggest the use of the DACUM method for detailing curriculum content and objectives. However, we see no reason why the Search Conference in its full three day format cannot be focused onto the fine detail of subject content and objectives.

The extent to which the method generates results which are reliable descriptors of the occupational or target area being studied, as well as of the needs of students, is dependent upon how well the participants represent the industry and the clients of the educational program. Since the search method requires the composition of the group participating in the Search Conference to be one reflecting the interests of all stakeholder groups, particularly industry, teachers and students, it is evident that the method does have the capacity to generate a useful picture of how technological change is altering the skill and knowledge requirements of an occupation. This capacity would presumably be enhanced by increasing the numbers, representativeness and expertise of those important data sources. The method may also reveal conflict between the parties interested in controlling the curriculum.

However, the ideal search workshop, limited as it is to about 35 participants, does not appear to provide as much potential for providing these reliable descriptors as a number of the more traditional quantitative research methods. (The point that should be borne in mind here though, is that the search method, by its very nature, is constructed on a rationale which affords a trade-off between large sample sizes and representativeness on the one hand, and specially selected interest, expertise, shared values and commitment on the other hand.)

Utility of the method's results

Circumstantial utility

Some search practitioners claim that there are no particular curriculum research circumstances where the search method would not be usable (Crombie, 1984, MacDonald, 1984). It has been argued that the search method is appropriate to curriculum research in TAFE across a range of study or

occupational areas, across all course levels (trade, technician, short specific purpose, personal development), across different student populations, and in different regions or communities. It would seem that the search method might be particularly suitable to projects where one or more of the following characteristics exist:

- search is serving as a beginning research strategy for a curriculum project;
- the circumstances are such that new courses are being developed;
- the occupational areas are those where there is rapid technological change;
- the study areas are those where the existing curriculum has not been examined or reviewed thoroughly for some time;
- the circumstances are such that there are likely to be diverse views and different perceptions among stakeholder groups of the state of the existing curriculum and of what changes should take place.

Curriculum development utility

In respect of generating data that are required for the purposes of developing assessment methods and other teaching/learning and delivery strategies and resources, it would appear that the search method again has no in-built facility for achieving these outcomes. If these outcomes are desired, then search would probably require supplementing with another research and/or analysis tool. These kinds of tasks could then be undertaken by one or more of the action groups formed at the conclusion of the Search Conference.

Quantity of data collected

In broad terms, a search method will not generate masses of data - mainly because this is not the central purpose of search. Rather, a search approach will result in general and qualitative data which is valuable in setting the scene and exposing and resolving issues which will be pertinent to the curriculum development activity to follow.

Capacity of the method to forecast

The Search Conference method is admirably suited to delivering data about

perceived future educational/training needs. Indeed, its whole structure is tailored to ensure that interested, concerned and expert people have an opportunity to share views on the future events that are likely to be important in stating educational needs for the present and future.

Capacity of the method to induce change

Theoretically, the search method has a great capacity to facilitate the achievement of desired curriculum changes. The extent of this method's capacity to support curriculum change can be appreciated when one considers the well-documented fact that people who are crucial to the implementation of curriculum changes (such as teachers) need to be actively involved in planning the curriculum change. This is the case with the search method.

As well, the innate dependence of the search method on sharing of values between major stakeholders and the derived sense of ownership and commitment to its outcomes, means that the search process does not ignore, as so many traditional research methods do, the important part played by people's attitudes (values and beliefs) in securing any kind of change. This has certainly been shown to be the case with curriculum change in TAFE. The attitudes and expectations of teachers especially are a very substantial variable in the equation of successfully securing curriculum change in TAFE.

As already noted, however, 'search' is not yet fully tested. But it does have promise particularly for illuminating the larger questions of:

. thrust (i.e. course aims);

. scope (what's in or out?);

. weights of emphasis (where do these lie?);

. sequencing (what before what?)

However, obtaining full representation from the cross-section of stakeholders is vital since last minute cancellations can seriously affect the quality of the conference output. Considerable attention must be given to following-up those invited. Those who cancel at the last minute should be replaced. For this it would be useful if replacements were picked at the time the original sample was selected.

TABLE 2.1

PROGRAM FOR A SEARCH CONFERENCE FOR

PASTRYCOOKING TRADE COURSE (NSW TAFE)

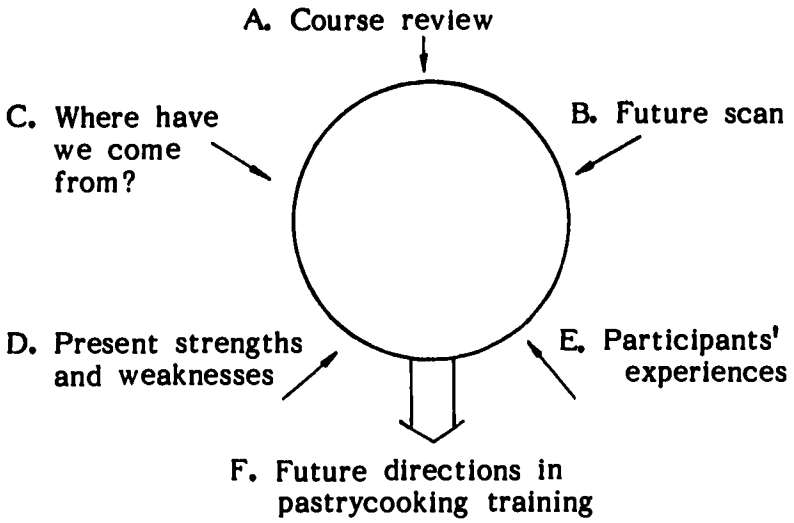
DAY ONE: COMMENCING LATE AFTERNOON

5.00 p.m. Brief context setting introduction including explanation of broad purpose of workshop, by TAFE curriculum officer responsible for conducting the review of the course.

5.05 p.m. Workshop manager commences proceedings by: 1. Ensuring participants were not unhappy about the presence of video equipment being used to record the proceedings for research purposes; 2. explaining relative small size of group - some industry representatives who were invited to attend were unable to do so; 3. providing an indication, in broad terms, of the timetable of the workshop; 4. providing an indication of the overall composition of the group of participants; 5. inviting participants to self-select into four groups (mixing with people not known) in order to share with the group information on (i) who am I? (ii) where do I work and what's my role? (iii) what experiences do I bring to the workshop? The workshop manager emphasises the importance of item 5 above, because the premise of the process is sharing and using all experiences. 6. Manager asks each group to nominate one member to lead a report-back session in the plenary session at 5.45 p.m.

5.10 p.m. Plenary report-back. Nominated member from each group reports on backgrounds and experiences of each member of group. During this session, the workshop manager introduces self and his co-worker. Manager enquires whether there is any concern about the presence of observers.

6.00 p.m. Conference briefing by workshop manager. Briefing comprises: 1. Review of conference timetable. 2. Manager provides overview of conference via: (a) provision of scope of 'futures' thinking for conference by suggesting a '1988 onwards' perspective, (b) provision of general guideline that we need to think what industry will be like then, work back from there and then determine what TAFE needs to do. 3. Reference to prepared schematic plan for Search Conference as below:



4. In explanation of the plan above: (A) The TAFE curriculum officer provided the overview of 'where have we come from.' Item (B) comprises the 'crystal-ball' gazing phase of the conference. Item (C) comprises the 'wind back the clock' phase of the conference by reference to the wisdom of the past. (D) Comprises the 'here and now' component - what are we good at? What are the gaps? Item (E) acknowledges that our experiences are an overriding input throughout the conference. These experiences are shared throughout. Item (F) addresses the question of how to design a better pastrycooking course.

5. Manager states the goal as he perceives it, viz, to at least arrive at a broad statement of what a pastrycook will need to know from 1988 onwards.

6. Questions and expressions of concern from participants are invited and discussed. These included: (A) Unrepresentativeness of the group - some participants felt certain important stakeholders had been overlooked (the ones identified were from specialised sections of the industry). (B) A teacher participant posited the view that industry people should determine their training needs. Manager responds by indicating that industry representatives will be involved in that process later in the workshop. (C) A participant queried the logic of proceeding from futures to past to present, in that order. Manager responded by reference to de Bono (lateral thinking) who stresses the importance of using our creative imagination about what is desirable before constraining or measuring this against the past or present difficulties.

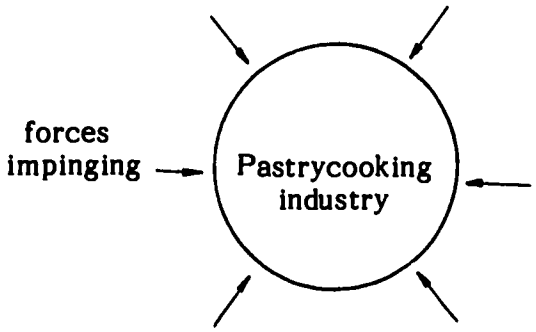
6.30 p.m. Dinner break. Participants attend a prepared buffet style dinner provided in a nearby room.

7.30 p.m. Future scan session. Manager advises on timetable for session and reminds participants how this session fits into the scheme for conference. He advises that the whole group will first spend 30 minutes in a lateral thinking stage and then in

three separate groups will put judgements (values) on the suggestions recorded.

Manager advises of three rules to be observed in the half hour plenary session. These are: 1. No speech making. 2. Short, sharp telegram-like suggestions. 3. Conflicting points of view are acceptable; these will not be debated or argued.

Manager reminds participants to think of the trends, major changes of which there seems to be evidence of occurring over the next 5 to 10 years. He also reminds participants to concentrate on the forces impinging on the industry (to stay outside the circle) as shown below:



Manager records contributions carefully. When two or more participants speak at once, he records one and returns to ensure the other(s) have not been missed. During this session, manager reminds participants to focus on what they see happening in the next 5 to 10 years - not what they would like to see. After about 20 to 30 contributions have been recorded, manager begins to round off session by observing that 'we seem to have the main ones ... have we done justice to this stage?; each one could be further detailed, but this can be done in smaller groups.' Several more contributions and clarifications are made and recorded.

Manager invites participants to divide into three groups with a mix of participants according to background. He provides groups with task guidelines as follows: 1. Sift through all the contributions recorded and strive to reach some agreement on the major trends. Pick out six to eight items as most significant. 2. Begin to spell out the implications each one has for TAFE training using the following framework:

Major trends	Implications for training
(a) _____	_____
(b) _____	_____
(c) _____	_____
etc.	

3. Spend 30 minutes and report back at 9.00 p.m.

8.30 p.m. Three groups meet in separate nearby rooms and attend to the task set for them.

9.00 p.m. Plenary reports. (Nominated member from each group reports back.) At the end of each report-back, manager asks for any additional comments from group members or clarifications from other participants.

9.35 p.m. Future scan close. Workshop manager reminds participants of the schedule for tomorrow.

DAY TWO: FULL DAY SESSION

9.00 a.m. 'Where have we come from?' Workshop manager recaps on purpose of conference and focuses on the next task of looking backwards. He encourages participants to look back at the major developments that have occurred in the industry and in TAFE training. A chronology begins to emerge beginning around 1926. Manager reminds participants during the course of this session that exact historical accuracy is not so important, however 'we' should strive to get an impression of important changes that have taken place.

Workshop manager records comments and seeks clarification as an ongoing process. He sometimes asks 'why did this event occur?' Manager rounds off session with 'have we got all the significant ones for now?' A few more contributions are made and recorded.

10.30 a.m. Morning tea.

11.00 a.m. 'Present strengths and weaknesses'. Manager invites participants to spend 10 to 15 minutes considering the present strengths and weaknesses of current training both in TAFE and on-the-job.

He advises that this session should be conducted in a large group setting and could simply be achieved by participants making contributions according to the following format:

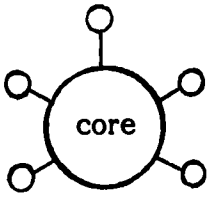
Strengths	Weaknesses
_____	_____
_____	_____
etc.	

Manager emphasises the valuable contributions students should be able to make to this session. After recording 10 to 15 entries in both columns, he asks 'have we got all the important ones?' Again a few more contributions are made.

11.20 p.m. Development of course objectives. Workshop manager then advises that we have arrived at the core of the problem, i.e. to begin to build a new course. After a quick recapitulation - future - past - present, he advises participants that they are not required to design the entire course in all its curriculum detail, but should first focus on: 1. The philosophy of the course. 2. The structure/organisation of the course. 3. The content areas of the course.

Manager suggests that for 1. above, each group should work to produce a statement of 'course objectives' which might serve to go in a course publicity brochure - a statement that would inform the reader about what a graduate would gain from the course. These should take into account the three domains of skills, knowledge and attitudes to be learned. For 2. above, he suggests that each group should try to produce an outline of the overall organisation of the course such as

or units in sequence, or



i.e. a core of study followed by various specialist studies

For 3. above, manager suggests a broad identification of the content areas of the course. Manager observes that to complete all of these in the time available is a major task and asks participants do they feel it is too much?

Participants indicate that the task is possible - in any case it can be commenced and this will be helpful to the whole review process. Manager suggests that for this task two larger groups be formed so as to limit the diversity of conclusions at this stage.

Finally, the manager advises that the outcomes of these sessions will comprise the major part of the conference report. Reporting back from each group will take place at about 2.00 p.m.

11.45 p.m. Two groups begin work on development of course objectives.

12.30 p.m. LUNCH BREAK

1.00 p.m. Two groups continue work on course objectives and structure of course.

2.10 p.m. Plenary report back.

Nominated member for each group reports back. For example **Group 1:** Provides a fairly general statement of course aims. Leads on to a discussion of course structure with recommended durations for units of study.

Manager asks plenary group to develop the aims and structures proposed, taking into account the list of strengths and weaknesses generated earlier. Discussion concludes that the list of strengths and weaknesses will probably be more useful in the detailed curriculum development phase of the review.

A discussion about the advantages and disadvantages of modular courses for pastrycooking ensued. Manager conducted a 'straw poll' on the question of suitability of modules for pastrycooking. He added that the decision of such a poll was significant because it reflected the view of people who 'cared, were experienced and who had participated in this conference. 'This was the key to success of the conference outcomes.'

A teacher contribution at this stage indicated that to determine the curriculum details for a revised pastrycooking course would require the identification of which content areas of the existing course were irrelevant. He observed that such decisions could probably not be made at this conference.

3.05 p.m. 'Where do we go from here?'

Workshop manager addresses the mechanism that now needs to be set in train to put into practice the outcomes of the workshop. He urges that the group should now take responsibility for what happens next. He suggests that three participants should meet to write up the papers generated by the workshop and this should be done as soon as possible. This draft would then be coordinated and recommendations based on these formulated to contribute to a final report. Such a small coordinating group serves as 'trustees' for the whole group. The report should receive wide circulation. Manager also suggests that this group might care to consider how the revised course will be maintained.

The coordinating group is nominated - the curriculum officer; a teacher; and two industry representatives.

4.00 p.m. Conference close. The workshop manager praises participants for their contributions and observes that he feels the outcomes were worthwhile.

2.3 THE DELPHI METHOD

Background and rationale

The Delphi method is a decision analysis procedure which has been extensively used in forecasting. It was developed in the 1950s as a way of finding the most reliable means of gaining the consensus of a group of experts about the likely pattern of future events concerning American national defence. Delphi is a general methodology rather than a fixed procedure. One of the advantages of Delphi 'is its flexibility to circumstance and degree' (Ulshack, 1983:114).

The philosophical underpinnings of the Delphi method are covered in some

detail by Linstone and Turoff (1975). The Delphi method assumes that society is directed towards goals and that these goals are the product of the actions of interest groups. Delphi does not necessarily ask what these interests are but asks what likely events are foreseeable. Delphi provides a means for finding out the areas of agreement and disagreement about the pattern of likely or desirable future events. By use of a series of questionnairs it draws this information from a panel of people who possess a position in society which provides a vantage point for viewing the interplay of a variety of forces. Because of the complex nature of these forces, no single person is in a position to provide an answer. But, according to the method, a carefully selected group, joined by a process which gives each access to the others' perceptions, can give a reliable estimate of future trends in a specified area. According to Ulshack 'Delphi may productively be used in need identification and setting training priorities for specific subjects' (1983:113).

Overview of Delphi

Its essential features are:

- It searches the views of a panel of selected experts, users, resource controllers or administrators, in relation to an issue or problem and then aggregates the judgements to identify likely trends.
- The points of view elicited are summarised and returned to respondents, a process which continues until consensus is approached or achieved.
- The method, in its conventional form, does not require participants to come together or to be known to each other.

A Delphi search can focus on expected major developments in a variety of fields (Bunning and Turoff, 1979:174), including trends in relation to new materials most likely to be taken up within an industry within a specified time frame (Enzer, 1975). It can provide a series of scenarios, future-tense descriptions of events that have not yet occurred with Delphi panelists judging the relative likelihood and ultimate desirability of the scenario event; or it can be used for developing probable cause lists for specific performance problems on specific service skills (Zemke and Kramlinger, 1982:150). Delphi can be used to clarify a problem located in the present or the future or to identify the essential components of a solution.

The process involves a series of feedback loops in which a monitor group poses a problem or question, gathers initial reactions from expert participants, collates or summarises the information which is then sent back to the original group, enabling each to view the other's statements before commenting again on the issue or problem. An important advantage of the method is that 'input gained as part of one step of the process is shared as part of the next step' (Rasp, 1976:151). The number of feedback loops needed is determined by the emergence of consensus from the group. Usually two or three rounds are sufficient though five rounds have been used (Delbecq et al. 1975:103). The number of panelists can be a handful or a hundred or more.

The critical factor in the success of a Delphi is that 'each participant must be genuinely interested in solving the problem' (Zemke and Kramlinger, 1982). Compared with the Nominal Group Technique (NGT), Delphi requires the least amount of time for participants, but takes longer in terms of calendar time (up to 45 days). Delphi, like NGT, prevents domination by a few individuals (Delbecq et al. 1975:83).

Linstone and Turoff (1975) describe two versions of Delphi, the conventional method and the conference method. Both versions involve administration of a questionnaire. In the conventional method a monitor team designs a questionnaire which is distributed to the respondent group or panel. The panel does not meet, nor are they identified to each other. The monitor team summarises the results and, based on the results, develops a new questionnaire so that the panel is given at least one opportunity to re-evaluate its original answers based on examination of the group response.

In the conference method, the Delphi process is applied while the group is assembled. Again, a monitor group prepares and administers a questionnaire, e.g. on an issue which has arisen. The very short time available for analysis usually means that the monitor group is replaced to a large degree by a computer which has been programmed to carry out the compilation of the group results.

Both forms of Delphi include four phases. The first phase explores the Delphi question and may use open-ended questions which can be analysed into categories. The second round can use closed questions, possibly with rating scales depending on the topic. In the second round phase an understanding is

reached of how the group views the issue in terms of dimensions such as 'importance', 'desirability' or 'feasibility' and includes agreement, disagreement and the meaning given to any relevant terms. The third phase entails an exploration of disagreement to bring out the underlying reasons and possibly to explore these reasons. The process is terminated when consensus is reached or the patterns of agreement or disagreement are reasonably clearly defined.

Delphi can also be used in a way that approximates survey research, 'where the variables are already developed and concern is only with refinement and movement towards consensus concerning the relative importance of individual variables' (Delbecq et al. (1975:90).

An example of the utility of Delphi in forecasting changes within an industry was provided by Enzer (1975:199-209) who applied the technique to the plastics industry in the USA. His study examined the material needs and resource allocations within the industry, and was based on the assumption that the types of plastics produced in the future would be determined more by what was desired (and pursued) than what was technologically possible at the time. This is an important point in favour of Delphi applied to an industry study. It can show how the likely actions of industry decision makers will exert pressure for certain aspects of current or emerging technology to be taken up. In contrast, a study which only examines what is technologically feasible in an industry (e.g. by surveying the literature on technological developments) may not indicate the likely direction which industry decision makers will take in relation to what they perceive as the likely market forces bearing on the industry. Delphi can illustrate 'how current policies and future possibilities may work together to form the desirable future' (Bunning, 1979:175). Data on likely industry trends can be very useful data for educational resource and curriculum development planning.

Enzer's (1975) application of Delphi to the plastics industry in the USA is summarised below:

Plastics were categorised into materials and properties (engineering, general purpose, glass fibre, foam, and non-plastics). Specific plastics within each category were listed. The Delphi panel was asked to: (1) review the materials and properties presented, indicating where they thought changes which would significantly affect the widespread use of the material were likely to occur

within the next 15 years; and (2) describe the anticipated properties of new materials which they thought were likely to evolve and gain widespread use by the specified target date. In both of these steps, the panel was asked to describe the new chemical, and physical or other technological developments that they believed would lead to the creation of the new material.

These inputs from the first Delphi round were used to prepare a three-part questionnaire for the final round of interrogation. These parts were (1) a summary of the panel's assessment of anticipated changes in existing material properties, such as weather resistance and impact strength; (2) a listing of both plastic and non-plastic materials with the nature of the anticipated major changes described and (3) a list of new materials expected to be available by the target date and a description of their properties, e.g. price, processability, tensile strength, etc. All thee parts of the questionnaire were open-ended in that respondents could add any additional items or comment on any item. Respondents were asked to rate the plastics in terms of whether they were 'outstanding in the property indicated; among the best in performance available', or gave 'acceptable performance in this property; still suitable in most cases', or were 'not acceptable if indicated property is important to intended use.'

The results of the first round Delphi were summarised and returned to the panel. Next, participants were asked if they agreed or disagreed with each summarised statement. In addition to changes suggested in existing materials, other materials were suggested by the panel as prospects for widespread use by the target date. These were submitted to the panel and their comments were sought on anticipated properties. By asking panelists to estimate production trends, Enzer (1975) was able to identify the likely growth points within the industry for certain types of plastics. An application of Delphi along the lines outlined above which included processes as well as materials, would provide a good basis for curriculum and resource allocation within an industry.

A study of the steel and ferroalloy industries (Goldstein, 1975:210-226) used the method of presenting a set of forecasting assumptions (future scenarios) which asked respondents to extend into the future a series of trend lines on production graphs and, in so doing, to state the key assumptions underlying the trend line extensions and the major uncertainties which they believed would affect these trends. Thus, the question sought to bring out the thinking behind

the forecasting estimates as well as the estimates themselves.

Costs and time

Delbecq et al.(1975) give the following estimate of the time taken to complete a Delphi process.

'1. Develop the Delphi question (0.5 day)
2. Select and contact likely respondents (2 days)
3. Select sample size (0.5 day)
4. Develop and test first questionnaire (10 days)
5. Analyse questionnaire (0.5 day)
6. Develop and test second questionnaire (11 days)
7. Analyse questionnaire (1 day)
8. Develop and test third questionnaire (11 days)
9. Analyse questionnaire (1 day)
10. Prepare and send out report (7 days)

TOTAL TIME: About 45 days.'

Planning and conducting a Delphi process

Delphi involves three groups of people; (1) the decision makers who will utilise the outcomes, i.e. those who have commissioned the study, (2) the professional team who will carry out the study and (3) the respondents or panel whose judgements are being sought. It is important to return the results of each round to participants promptly. Bunning and Turoff (1979:180) recommend a 'ten-day turn around time.' They advise that respondents who do not return their questionnaires on time should be sent a new questionnaire immediately, followed by a tactful reminder. The third round questionnaire is reported to be the most difficult for respondents to complete and suffers the highest attrition rate (Bunning and Turoff, 1979:180).

Main steps in the method

1. Develop the Delphi question(s)

The first step in developing the Delphi question(s) is to define the objectives of the study, the type of information which is required, and the types of respondents needed to ensure a cross-sectional view. The aim of the Delphi question is to develop a 'broad range of input' (Rasp, 1976:154). Bunning and Turoff advise that the number of questions should be limited to as few as possible and the questionnaire should provide only limited space (perhaps three

which participants can respond (1979:181). Examples of Delphi questions include: 'Think about the professional nurse delivering outpatient (ambulatory) health care. What is the professional nurse responsible for today that such a person should not be generally responsible for ten years from now? In each case, provide a brief example, possibly from your own experience, that leads you to believe this is an important and desirable change?' The responses to this question were later returned to respondents in the following form with participants asked to rank the top seven items (see Delbecq et al. 1975:149-171):

Vote	responsibilities	Comment
	In ten years, nurses in an outpatient/ambulatory setting will be responsible for: (List of items generated)	

In a study of the needs of a school district (Ellenstown), Rasp used the following Delphi approach (1976:152-3). The questionnaire asked respondents to: 'Think in terms of what conditions are likely to be present during the decade 1975 to 1985 and what the results of the Ellenstown schools ought to be in view of these conditions. Specific statements would be more helpful than general ones.'

As a result of the experiences provided by the Ellenstown School District, students should:

Know ----------
Be able to ----------
Feel ----------

Ellenstown School District should:

Increase ----------
Maintain ----------
Reduce ----------
Develop ----------

The second round questionnaire sought ratings as follows:

low ability high ability

1 2 3 4 5 Be able to read and understand the newspaper.

In the third round questionnaire, the same layout was used as the example immediately above, but the priority most frequently mentioned by other respondents was shown by enclosing one of the numbers in a box. Respondents where asked to circle their choice. This information enabled the consensus to be calculated and also a minority or dissenting report could be prepared for each item. The final data gave priorities, consensus percentages and dissenting opinions.

2. Select and contact respondents

It is vital that respondents feel personally involved in the problem of concern to the researchers, have pertinent information to share, are motivated to see the process through and value the type of information which will be produced. Once the general characteristics of the desired respondents are identified, the final sample is usually selected by a nomination process in which key people in the target group or groups nominate those who would be in a position to provide the necessary information. Random sampling may also be used. Zemke and Kramlinger (1982:150) caution that 'a single panelist performing in a perfunctory manner can create distortions'. Delbecq et al. (1975:88) advise that potential respondents should be contacted by telephone or in person by 'someone whom the respondent respects' who will explain the objectives, the nature of the panel, the obligations of respondents and the length of time the process takes. 'Only after a detailed and personal introduction will most respondents participate fully in the Delphi process' (Delbecq et al. 1975:88).

3. Select sample size

With a homogeneous group of people, 10-15 participants can be enough. But in cases were a number of target groups are involved, the sample might run to several hundred people. Delbecq et al. (1975:89) report that with homogeneous groups few new ideas are generated once the sample group exceeds thirty well-chosen participants. The greater the number of

participants, of course, the more time consuming is the analysis.

4. Questionnaire analysis

Round 1. The purpose of the analysis of the first-round questionnaire is to arrive at a mutually exclusive but exhaustive set of categories which accurately conveys the meaning which respondents attempted to communicate in their answers to the first questionnaire. Bunning and Turoff (1979:177) suggest the following rating scales for trend, desirability and needs assessment.

'the likelihood or feasibility of this trend developing will be:

4 - almost certain
3 - probable
2 - possible
1 - improbable
0 - virtually impossible.

the desirability of this trend occurring will be:

4 - very great
3 - great
2 - moderate
1 - slight
0 - no or none

Training needs priority:

1 - high priority
2 - above average priority
3 - average priority
4 - below average priority
5 - lowest priority'

Round 2. The questionnaire for the second round asks participants to review the items identified in the first round. The aim is to identify the areas of agreement and disagreement, the items requiring clarification and to obtain an early understanding of priorities emerging. Participants are asked to review the list of items, commenting, asking questions or arguing in favour of against items; and to select the ten items they feel are most important, assigning a value of 10 to the most important item and 1 to the least important item (Delbecq et al, 1975).

The analysis should record the frequency of comments on items, and

summarise comments made about items. This provides preliminary indication of the priorities which the panel has given to particular items.

A form of second round questionnaire used by Bunning and Turoff (1979:177) presented respondents with a list of items and a five point scale on which was shown the 'modal consensus' (circled):

'Emerging or future markets to consider in promoting (Brand X) for use in product manufacture are:

	your response	consensus
1. Solar energy development	1 2 3 (4) 5	

Reason ----------

---------'

Round 3. The final questionnaire permits respondents to review prior responses and express their individual judgments as to the importance of each item.

Suitability for use in TAFE

An important use of Delphi would appear to be in forecasting short-term (0-5 years) and medium-term (6-10 years) trends within an occupation, in order to provide additional information for educational resource planning and curriculum development. The utility for curriculum development of accurate trend information on materials, processes and equipment, is obvious. But Delphi has other uses. Rasp (1976:150) notes that Delphi has been used to predict developments in teacher education, educational administration and federal funding. The conference form of Delphi can be used to explore and identify the central themes in an issue which arises in a curriculum development workshop or seminar. The great advantage of the process is that it links participants so that each has access to the thinking of the other before forming a final opinion on a complex issue. Delphi appears to offer an excellent 'warm-up' procedure when it precedes a workshop. Delphi with one round of feedback would make a good introduction to a Search Conference or a DACUM or NGT workshop. In such an application, the clarification of agreement or disagreement could take place during the workshop before an attempt to identify or prioritize essential elements. A full Delphi followed by

a Search Conference in which the Delphi results were included in the future scan section would overcome one of the uncertainties about the Search Conference method: the ability of the participants to read the future in depth.

Advantages and disadvantages

Advantages claimed for Delphi include:

- It provides a framework by which individuals who are distant in space can be linked. Since travel time and cost is eliminated, the method can include people who would not normally be able to participate in a group setting.
- Participants have access to the pooled data before giving final comments or priority rankings.
- Participants remain anonymous.
- The method describes what key decision makers believe is likely to happen, given what is technologically possible and indicates areas where industry activity is likely to exert pressure for technological advances arising, for example, from likely market demands.
- The method is forward-looking and provides a process which keeps respondents focusing on trends.
- The methods provides time for thinking and reflection, including reflection on first thoughts in the light of the ideas of others.
- It is claimed that the method tends to minimise psychological communication barriers, such as leadership, hidden agendas, personality conflicts and group pressures for conformity.
- It provides each participant with equal opportunities for influences.
- It provides precise documentation.

Disadvantages/limitations

Delphi is largely supported and legitimised by assumptions rather than research findings. Two assumptions are: '(1) if participants agree and by agreeing, move closer to a central position or consensus, then the resulting data is more believable; (2) that anonymous responses such as those generated by the Delphi are more likely to lead to reasonable and objective input than

are the activities of interpersonal conferencing' (Rasp, 1976:151). Delphi data is limited to subjective judgments. However, there are times when this is the only data available.

The development of the second round questionnaire can be difficult. Rasp (1976:154) notes that 'uneasiness' can occur amongst users at this stage. Moreover, 'the pull toward consensus is strong, frequently stronger than a position of verified accuracy' (Rasp, 1976:152). In other words, the pressure to achieve consensus may bias respondents' replies.

Another problem is that some future events are unpredictable. As Mark Twain said: 'Actually, February is a very bad month in which to predict the future. So is March, April, May...!'. Other disadvantages (Bunning and Turoff, 1979:179) include: under or over-estimating the likelihood of future developments; there is an inherent difficulty in imagining the future even after key events have been assumed; it is often difficult to distinguish desires from forecasts; it is often difficult to define and integrate cross impacts among specific forecasts; and important possibilities are often overlooked. Other difficulties include that of stating expectations in the crispness of language and the precision of judgement more often associated with technological changes. Participants do not like to start, so to speak, with a blank sheet of paper. There is a heavy expenditure of time in completing the various questionnaires and 'the method relies on participants who have much stamina' (Finch and Crunkilton, 1979:132).

Conclusions

Delphi has the advantage that it collects, and organises judgements in a systematic manner. It builds a picture of where consensus lies and it shows dissent (Rasp, 1976:155). The method 'avoids the pitfalls of public group discussion: group pressures, an unwillingness to abandon publicly stated opinions, and the effects that individuals have on groups' (Bunning and Turoff, 1979:178).

In a comparison between the Nominal Group Technique and Delphi it was found that the Delphi group provided more alternatives to a problem situation, and more innovative ideas (Zemke and Kramlinger, 1982:151).

A stance strongly critical of Delphi was taken by Weaver (1971). His criticisms apply to forecasting methods in general and so have applicability to

the Search Conference method as well as Delphi. Weaver argues that 'In order to effectively evaluate forecasting methods one must be able to test the plausibility of the forecast which results' (1971:267). To test plausibility, one must test the reasonableness of the arguments which support the forecast. Delphi skirts this issue by selecting expert consensus or argument as the measure of the forecast. 'But consensus alone is not a sufficient condition for arguing that a forecast is plausible and convincing' (Weaver, 1971:269). Weaver points out that it is not possible to precisely identify the Dephi findings which 'reflect rational judgment as opposed to feeling of desirability' (1971:268). It is possible, as Weaver notes, that the data base available to social science forecasting is shifting and more unreliable than technological data. Social science forecasts 'are more likely biased by personal values than technological forecasts' (1971:269). This suggests that Delphi, in curriculum research applications, should concentrate on identifying those aspects of change in an occupation which the panel sees as apparent now (even if the signals are only comparatively weak) and that the time frame should be more like 'now to five years time' rather than the more distant and more speculative 5-10 years; and that Delphi should concentrate on technological aspects such as material, processes and equipment.

CHAPTER 3

ANALYSING THE 'HERE AND NOW' OF AN OCCUPATION

3.1 THE NOMINAL GROUP TECHNIQUE (NGT)

Background to NGT

The nominal group technique grew out of psychological studies in the USA in the 1950s into ways of improving group interaction on problem-solving tasks, when it was found that groups in which individuals worked alone, that is, were a group in name only, hence 'nominal' groups, produced more ideas under 'brainstorming' rules (generating ideas without criticism) than groups in which a problem was talked over (Shaw, 1971:72).

The Nominal Group Technique is a structured process of group 'brainstorming' which facilitates group-based decision making when applied to certain types of planning problems. It is a process strictly controlled by the leader: verbal interaction is restricted, to a large extent, to leader-individual dialogue and discussion within the group is actively discouraged by the leader. The degree of leader control, unless sensitively handled, can pose problems in applying the method.

The Nominal Group Technique can be used to define a problem or to generate solutions. The method has two distinctive features: (1) a 'brainstorming' stage in which members respond to a carefully designed question by writing ideas silently and independently, and (2) a process of mathematically deriving the group's consensus as to which are the important dimensions of the problem or the most salient solutions.

The method has been widely used as an aid to solving organisational development problems and has been successfully applied to curriculum development in TAFE. Although the appropriate group size is 8-10 people, a number of NGT groups can be run simultaneously, or the procedure can be used on a number of different target groups. The method is described by O'Neil (1981:58) as a powerful and cost-efficient method of data collection where views are sought about the efficiency or effectiveness of particular programs or the likely effects of changes in particular programs. Before

discussing the reasons behind NGT and the method in detail, we will present a summary of its main steps.

The main steps in an NGT workshop are:

- Explanation of the method.
- Presentation of the 'NGT question' which will serve to focus the brainstorming efforts of the group.
- Silent generation of ideas in writing by the group. (See Note below.)
- Statement of ideas by each member in turn (round-robin listing) until all ideas are listed on a flip chart visible to the group.
- Discussion of ideas is limited to clarification only.
- The listed items are merged, simplified or organised, as needed and with the agreement of the group. Again, discussion is limited to clarification.
- Preliminary voting to establish priority of items.
- Discussion of items - additions and merging.
- Final vote.

NOTE: These 'ideas' refer to either elements of the problem or solutions depending on whether the NGT is attempting to find what is the problem or, if this is known, to find solutions. Sometimes these two stages are covered in one NGT.

Rationale for NGT

NGT is based on the idea that one of the critical process characteristics facilitating creativity is the separation of problems from solutions (Delbecq et al. 1975:22). Group processes which 'separate ideation (problem identification) from evaluation (solution getting) are superior to group processes which combine them' due to the human tendency to seek solutions before the problem is fully understood (Delbecq et al. 1975:22). This claim is supported by Hegarty: 'The structured nature of the technique helps a group to attain superior performance in fact finding and idea generation when identifying problems as a starting point in the decision-making process' (1975:33). Delbecq at al. (1975:27) suggest that disagreement between group members can either

lead to hard feelings or to creative decision making depending on how it is controlled. Hard feelings can be generated by allowing disagreements to become personal or be smoothed over by humor or withdrawal. Creative problem solving, they argue, can be achieved by separating persons from problems, and attacking the problem, not the person (1975:27).

Delbecq et al. (1975:9) make a number of claims for the method. These are discussed in turn.

'1. It assures different processes for each phase of creativity (fact finding and evaluation).
2. It balances participation among members.
3. It incorporates mathematical voting techniques in the aggregation of the group judgment.'

Claim 1. In the fact-finding stage NGT generates data about the problem or, alternatively, if the problem is known, NGT generates possible solutions. These solutions are synthesised in the evaluation phase during which the group screens and selects the 'strategic elements of a problem or component elements of alternative solutions' (Delbecq et al. 1975:9).

Claim 2. Balanced participation is fostered by the procedure of silent and independent generation of ideas and round-robin listing, a process which according to Delbecq et al. (1975:33) 'facilitates the self-disclosure of ideas even by less secure members' who may hesitate to speak in conventional group discussions. Moreover, 'the round-robin procedure of writing items on a blackboard or flip-chart reduces arguments over semantics, increases retention of ideas, and decreases redundancy of discussion'. This process is the key to the method. It aims to prevent the problem which can happen in the conventional interacting group discussion, of a few people dominating the discussion.

Claim 3. The voting procedure and rank ordering of items enables group consensus to be established relatively easily.

The silent generation of ideas, a method which effectively ensures that each person will be heard, is claimed to provide adequate time for thinking and reflection; a process encouraged by the presence of others similarly engaged. The method is said to foster decision making by the avoidance of interruptions; the avoidance of undue focusing on a particular idea or train of thought;

avoidance of competition, conformity and status pressures, that is, the method claims to reduce the influence on a group by dominant members possessing personal magnetism, high social status or hierarchical position-power (Delbecq et al. 1975:9).

The round-robin listing of ideas permits equal participation in the presentation of ideas; an increase in problem-centredness; a separation of ideas from personalities; an increase in the ability to deal with a larger number of ideas; tolerance of conflicting ideas; encouragement of the stimulation of other group members by the ideas emerging; and the provision of a written record (Delbecq et al. 1875:47).

The method claims to improve the task-focussed communication structure of groups by remaining problem-centred, rather than people centred. Furthermore, the method avoids choosing between ideas prematurely since ranking of ideas is delayed until all ideas are listed. Another claim is that the method fosters 'hitch-hiking' (latching onto and building upon the ideas of others), leading to greater quality of views expressed. This claim is supported by Roe and McDonald (1983:33) who state that a well handled NGT 'can provide considerable insight into the views of any group of staff or students...'. The Nominal Group Technique can be used as a bridge between 'supervisors and subordinates, and between teachers and administrators' and is 'a means of identifying the problems perceived to exist between such groups' (O'Neil, 1981:48). So NGT can be used to detect areas of tension affecting planning or implementation.

Despite its authoritarian character (power strongly centred in the hands of the leader, leader-member dialogue permitted not member-member dialogue), NGT was designed to overcome a problem which can arise in groups: the effort required by the facilitator in handling emotional factors (tension, conflict, dominance) rather than task-oriented factors.

Delbecq et al. (1975) also present the view that interacting groups often display a reluctance to attack the task by such practices as diversionary questions, personal statements or ideologies expressed regarding the task. Ideologies embody, among other things, sets of beliefs which obscure or hide the real facts (Billig, 1979).

According to Delbecq et al. (1975:34) NGT includes a number of

characteristics which facilitate decision-making performance:

1. Low variability among groups in member and leader behaviour leads to consistency in decision making.

2. A balanced concern for socio-emotional group maintenance roles and performance of task-instrumental roles offers both social reinforcement and task accomplishment reward to group members.

3. The silent independent generation of ideas, followed by further thought and listening during the round-robin procedure results in high quality of ideas.

4. Search behaviour is proactive (as opposed to 'reactive', see Note 1, p.88), characterised by extended periods in generating and clarifying alternative dimensions of the problem, tendencies for high task-centred group effort, and the generation of new social and task-related knowledge.

5. The structured process forces equality of participation among members in generating information on the problem.

6. NGT meetings tend to conclude with a perceived sense of closure, accomplishment, and interest in further phases of problem solving.

4. Conducting an NGT workshop

The main steps, their objectives and the guidelines for the facilitator role, based largely on Delbecq et al. (1975), are set out in Table 3.1 and then described in detail.

TABLE 3.1

FACILITATOR GUIDE TO CONDUCTING AN NGT WORKSHOP

Steps/objectives	Facilitator role
THE NGT WORKSHOP	
Step 1: Silent generation of ideas in writing. Objectives: to map the group's thinking and enable equal participation.	Have the NGT question in writing. Explain the task is to write responses silently and independently, in brief phrases or statements. Do not discuss the question or allow interruptions except to explain the process. Illustrate the level of abstraction and scope with an example which does not distort (lead) group responses. Remain silent yourself while group works. Do not walk around the group. Quieten any disruptions by addressing comments to the group as a whole.
Step 2: Round-robin listing of ideas.	Explain the step is to map the group's thinking. Ideas should be presented in brief words or phrases and will be taken one at a time from each member. Don't alter ideas when recording them. Write quickly. Make the list visible to all. Eliminate duplicate items only if the group agrees. No discussion but encourage 'hitch-hiking' and adding of new ideas not previously recorded by members. (The 'no discussion' rule is meant to avoid argumentation). Vary the rule if the ideas are flowing, but reaffirm the principle of no criticism or evaluation at this stage. Allow individuals to 'pass' but to re-enter at any time.

Steps/objectives	Facilitator role
Step 3: Serial discussion of ideas for clarification. **Objectives:** to ensure that each item is understood clearly and that all items are covered.	Define the task as 'clarification'. Minimise argumentation but do not be heavy handed. Explain that final judgment will be expressed by voting. Allow speakers to state the logic or facts behind any item. Encourage addition of new ideas sparked from the ideas of others. Avoid forcing any member to be the sole person responsible for clarifying his/her item.

NOTE: If items are separate, proceed to next step. If items overlap a clustering or 'collating' step should be added at this stage in order to simplify and organise the listed items. Do not merge items without agreement of the proposer.

Step 4: Preliminary vote on item importance. **Objectives:** to enable individuals to make independent judgements; to express these by rank ordering or rating items; to use the arithmetical mean as the group's decision to present the results for further discussion and re-voting.	Explain the voting procedure, or negotiate (rank ordering or rating scale use) with group. All items to be ranked. Ranking is done privately on index cards then collected, shuffled (to protect anonymity) and the results recorded beside the items on the flip-chart.

Steps/objectives	Facilitator role
Step 5: Discussion of preliminary vote.	Define task as clarification, not social pressure. Keep discussion brief so as not to distort perception of items not discussed. Avoid being heavy handed. Some members whose ideas were not highly ranked may feel that their importance was not appreciated. Caution members to think carefully about any changes they make in their voting.
Step 6: Final vote. (Repeat Step 4).	

Planning and conduct of NGT

Writing the NGT question

Crucial to the conduct of a successful NGT exercise is the wording of the NGT question which will focus the group's work. Delbecq et al. (1975:76) note that it is virtually impossible to frame an NGT question unless the objective (note the use of the singular 'objective') of the meeting is clear. They advise the following steps.

'1. Staff discussion of the objective of the NGT meeting.

2. Staff illustration of the type of items sought in terms of (a) level of abstraction, (b) depth versus breadth.

3. Staff development of alternative questions.

4. Pilot testing alternative questions with a sample group.'

According to Hegarty (1977:33):

> The task posed by the NGT question must be phrased in such a way that participants can make direct use of their own knowledge and experience ... it is stressed that all types of problems are wanted - feelings and attitudes as well as educational, scientific, administrative and technical difficulties

A crucial concern with the NGT question is what level of information is needed: information at a general level (i.e. course aims) or at a detailed level (i.e. tasks).

When the composition of the group includes people whose technical expertise does not cover the whole scope of the area under investigation, the group can be asked to list critical incidents or examples or descriptions of behaviour for the areas known to them rather than list categories or general problem labels as these can be extracted later. (See the discussion of the Critical Incident Technique in Section 3.3). These can then be analysed to find 'core' competencies and hence course aims or subject aims.

Examples of 'broad', 'narrow' and 'personal' NGT questions include: 'What are the weaknesses associated with this course' (BROAD); 'In the light of potential needs of the late 1980s, what do you personally think are the important ingredients in the revised B.Ed. course?' (BROAD); 'List problems which you have encountered in connection with the goals, objectives, learning program and outcomes of the microbiology course for final year science students at this university' (BROAD) 'What are the really good aspects of this course unit - the sort of things that would make you recommend it to other people?' (BROAD) 'What aspects of this course unit do you think should be changed?' (SPECIFIC). 'What difficulties have you experienced in meeting assignment deadlines?' (NARROW); 'What insights have you gained as a consequence of participating in this learning group?' (PERSONAL).

Group size

NGT is suitable for groups of up to nine or ten people. A small meeting room is required with seating arranged around a table with a flip-chart at one end, or in a 'U' shape. The method can be used with a number of small groups working simultaneously.

You will need:

- flip chart
- roll of masking tape
- pack of cards approximately 13 X 8 cm
- felt pens
- paper and pencil for each participant

Welcoming statement:

- give a warm and cordial welcome
- give a sense of importance to the task at hand
- state the importance of each members contribution
- give an indication of the use or purpose of the meeting's output.

The NGT workshop

Step 1: Silent generation of ideas in writing

In this step members are presented with the nominal question in written form. The aim is to generate, in Step 2, a 'master list' of ideas. The leader reads the question aloud, then asks the group to write ideas in brief phrases or statements while working silently and independently for about 5-15 minutes depending on the task (longer in special circumstances). The leader should resist 'non-process clarifications' that is should not discuss or explain the question but only the process of addressing it, i.e. by silent generation of ideas. The rule of not discussing the question is intended to avoid giving verbal or non-verbal cues as to how it should be answered. Members who disturb the silence of the group should be sanctioned (Delbecq et al. 1975:45).

Step 2: Round-robin recording of ideas

The ideas of the group are taken one at a time from each person and recorded on the flip-chart visible to the entire group. No editing of material or evaluative comments are allowed. The leader guidelines for this step are:

'1. Clear verbal statement of the step:
   a) the objective is to map the group's thinking.
   b) ideas should be presented in brief words or phrases.
   c) ideas will be taken serially.
2. Effective mechanical recording.
3. Direct sanction of inappropriate group behaviour.'
   (Delbecq et al. 1975:49).

Examples. 'Mr Smith, would you give me one idea from your list'. If a group member states that he/she has no more ideas, the leader can move on to the next person but should say something encouraging like: '...feel free to contribute another idea if you want to'.

Recording guidelines. Record ideas as rapidly as possible, in the words used

by the group members (very important). Provide assistance in abbreviating only in special situations. Make the entire list visible to the group by placing completed sheets on the wall. In cases where a person is having difficulty presenting an idea in clear, simple terms, the leader might ask the person to think the idea over in order to turn it into a few words or a short phrase. The reasons for recording ideas in the contributor's exact words are that it increases the perception of equality and values the contribution as important, gives greater personal involvement in the task, and eliminates any possibility that the leader is manipulating the group (by altering or deleting words). Sometimes during this phase group members will spontaneously begin to discuss the ideas or note similarities with ideas already stated. The leader should resist discussion until all ideas are listed, saying 'let's wait until we have heard all the ideas'. If a group member feels that his/her idea is different from one already stated, the leader can place the responsibility back on the group member, e.g. 'If you feel your idea is slightly different, let's put it up on the chart'. This stage may spark additional ideas by allowing members 'to periodically 'interact' with the group, and, more important, to 'hitch-hike' on the ideas of others' (O'Neil, 1981:49).

Step 3: Serial discussion for clarification

Each idea is discussed in turn. The benefits of this are:

> '(1) avoidance of focusing unduly on any particular idea or subset of ideas, (2) Opportunity for clarification and elimination of misunderstanding, (3) Opportunity to provide the logic behind arguments and disagreements, (4) Recording of differences of opinion without undue argumentation'. (Delbecq et al. 1975:52)

The central objective in the discussion stage is to 'clarify, not win arguments' and 'to minimise influence based on verbal prominence or status' (Delbecq et al. 1975:52). The purpose of clarification is so that the other members can understand the meaning of the brief words or phrase. It can include explanation of the logic or analysis behind the item and the relative importance placed by the contributor on the item.

During this stage the leader should 'pace' the discussion, that is, not allow discussion to: unduly focus on any particular item, or to degenerate into argumentation. However, differing points of view should be aired but the leader then move the discussion onto the next item (Delbecq et al. 1975:53).

Note again that the purpose is to disclose thinking and analysis, not to resolve differences of opinion. The authors argue that differences of opinion will be 'accurately recorded in the voting procedure' (1975:53).

The role of the leader in this step is stated by Delbecq et al. (1975) as.

1. 'Verbally define the purpose as clarification.
2. Pace the group to avoid undue argument or the neglect of certain items at the expense of others'.

When an argument develops the leader can say: 'I think we understand both points of view at this point. Perhaps, however, we should move onto the next item in the interests of time' (Delbecq et al. 1975:54). The authors note that 'groups generally pace themselves if the leader clearly indicates the available time for the step.'

Step 4: Preliminary vote on item importance

Delbecq et al. (1975:56-61 recommend the following rank ordering voting procedure.

'1. Ask participants to select from the flip chart sheets the five most important items and to record the number of each item on the cards provided (in say, the upper left hand corner), then to write the identifying words or phrases on the card (in the centre). If the list of items is long you may ask for up to eight items to be selected in order of importance.

2. Ask participants not to rank order the actual cards at this stage.

3. When participants are ready, ask them to spread out their cards and select the most important one first (or the least important one) and to write the number of the rank which the person wishes to give to the item in one corner (e.g. the bottom right hand corner) and to proceed until the ranking process is completed.'

In some cases it is helpful to give the group criteria for the ranking, e.g. 'what five items are central in preparing a student for work in ...?'; or, 'which five items tell us what theory knowledge (or what practical knowledge) a student must have'; 'what five items tell us most about the likely changes in the occupation in ...' (specify time frame) (See Note 2). If criteria are used, these should fit within the logic or scope of the NGT question. Other users of

NGT have adopted the practice of asking the group to rank the ten top items (O'Neil, 1981).

Below is an example of an index card illustrating the rank order voting procedure.

5 (Item number from flip chart)

(Summary of actual item)

Member's rank X

Step 5: Discussion of preliminary vote

The aim of the discussion is to:

1. Examine inconsistent voting patterns.
2. Provide opportunity to re-discuss items which are perceived as receiving too many or too few votes. (Delbecq et al. 1975:62)

The leader defines the task as 'clarification, not social pressure' and ensures that discussion is brief (Delbecq et al. 1975:63). The leader tries to ensure that the voting is not influenced by errors due to misinformation, misunderstanding, or unequal information (hence the importance on the rule of seeking clarification). However, Delbecq et al. (1975:63) note that discussion can decrease accuracy. They suggest the leader gives a statement at the beginning and the end, along the following lines:

At the beginning

It may be worthwhile to briefly examine the voting pattern ... to see if there are any inconsistencies, surprises, or differences members wish to comment on. The purpose of this discussion is not to pressure any member to change his or her vote ... if we gain additional clarification some members may wish to modify their original vote.

At the end

... the purpose of this discussion has not been to get you to change your original vote ... however, if you honestly have a new perspective as a result of the

discussion, you should change your vote.

Another rating method (O'Neil, 1981) is to use a 5-point Likert-type scale for each item generated in the workshop, for example,

STRONGLY AGREE 1 2 3 4 5 DISAGREE

The ratings are summed and the average calculated (average = sum of the scores, divided by the number of cases). Rating scales are useful if greater 'judgemental accuracy' is needed but 'depends on the degree of information possessed by the group' (Delbecq et al. 1975:63). If a long list of items is generated by the group, individuals can rank the items in order of importance then write these in a column beside each item on the flip chart sheets. By scanning the results an approximation of the importance of items can be obtained and then these items extracted.

Step 6: Final vote

The final vote:

1. Determines the outcome of the meeting.
2. Provides a sense of closure and accomplishment.
3. Documents the group judgment. (Delbecq et al. 1975:63).

The procedure for rank ordering the final vote depends on the degree of refinement sought. In some cases where the topic is general, the procedure in Step 4 (preliminary vote) can be repeated in which priorities are simply rearranged. If fine detail is sought, Delbecq et al. (1975:64-5) suggest either of the following methods shown in Tables 3.2 and 3.3:

TABLE 3.2

NGT RATING FORM FOR FINAL VOTING: VERSION 1

No. from flip chart	Item description	Most important
		100
_____	_____	90
		80
_____	_____	70
		60
_____	_____	50
		40
_____	_____	30
		20
_____	_____	10
		0
		Least important

Instructions

1. Choose the five most important items from the flip chart and list them in rank order above.

2. Identify the item by using the number and description from the flip chart.

3. Draw a line from the item to the scale (0-100) at the right, indicating the relative importance of each item.

TABLE 3.3

NGT RATING FORM FOR FINAL VOTING: VERSION 2

No. from flip chart	Item description	Relative importance Not important	Very important

Instructions

1. Choose the five most important items from the flip chart, and list them in rank order above.
2. Identify the items by using the number and description from the flip chart.
3. Rate each item in terms of its importance on the 0-10 scale, with 0 being unimportant, and 10 being very important.

Analysis of data

The data from an NGT workshop may need amplification since NGT can generate items which require further research.

Suitability and value of the method in TAFE curriculum development

According to O'Neil (1981:45) the method is suitable for needs assessment because it allows assessment of 'consumer (student/teacher) rather than producer (lecturer/project leader) interests'. Curriculum research applications of NGT have included curriculum planning, course content evaluation, determination of learning outcomes and needs of students for a professionally relevant course (O'Neil, 1981:45).

The Nominal Group Technique is appropriate, according to Delbecq et al. (1975:81) when it is required to: Identify the elements of a problem situation, identify elements of a solution program and to establish priorities. NGT works whenever the decision task is complex and 'calls for the pooling or aggregation of individual judgments' and is not so appropriate 'when the aim of the group meeting is information exchange and co-ordination'. In the latter case (sharing and exchange of information) the conventional group discussion is better (Ford and Nemiroff, 1975:182).

Modifications

Using NGT with larger groups

Delbecq et al. (1975:70-72) suggest dividing the large group into groups of 5-7 persons and after Step 4 (preliminary vote) the leaders of each group meet to prepare a master list. In this process, each leader explains the top five items identified by his/her group, then each leader independently combines duplicate items and any disagreements are discussed. Next, a carefully worded statement is prepared which will convey the accurate meaning for both the combined and individual items. This, together with the original rankings, is presented to the whole group which:

- Discusses and clarifies the master list. (Clarification is essential as some statements will have been altered.)
- Discusses the preliminary vote and the relative importance of items.
- Makes any additions.
- Votes.

In an application of NGT to a university level microbiology course, four groups were used: Representatives of students, teachers, a group with an understanding of the context (i.e. who understood the relationship between various units in the course and the relationship of microbiology to other disciplines), and a group of subject matter specialists and curriculum planners (Hegarty, 1977:39). This latter group included a significant number of people who would be involved in curriculum design.

NGT in exploratory research

Exploratory research or pilot research involves the investigation of complex problems whose qualitative and quantitative dimensions are unknown (Delbecq et

al. 1975:109). They contend that NGT can be used to

'1. Identify and enrich the researcher's understanding of a problem by providing judgmental item identification, refined by priority ranking and voting.

2. Arrive at a set of hypotheses concerning the meaning and effects of determinate aspects of the problem areas.

3. Focus attention on the major areas of inquiry, defined by target groups in their own jargon, which may be pursued in greater detail later by means of interview or questionnaire instruments' (Delbecq et al. 1975:112).

However, the following methodological difficulties should be noted.

. The selection of target groups for problem exploration.
. The specification of the question to be used in NGT meetings for gathering data from target groups.
. The transformation of this raw data into standardised measurement instruments.

In exploratory research applications the formulation of the NGT question should bear in mind the following question: 'What insightful or crucial information does each target group possess that would help us to understand the dimensions of the problem' (Delbecq et al. 1975:114). They contend that NGT can be used with a broad question in order to 'elicit varied responses'. Subsequent meetings or NGT programs can be used to refine the question.

O'Neil (1981) used NGT data in an evaluation questionnaire by the simple procedure of turning the data into questionnaire items using a 5-point scale: 1, Strongly disagree. 2, Disagree. 3, Neither disagree nor agree. 4, Agree. 5. Strongly agree.

Costs and time

Depending on the problem, the number of simultaneous groups working and the number of items generated, NGT can take from two hours to two or three days, even more if conducted on a number of target groups. In a detailed curriculum development exercise, the process may begin in the conventional form in order to generate the dimensions of the problem. These dimensions could then be addressed by other methods such as DACUM-type methods aimed at stating the knowledge and skills required by the competencies identified by

the NGT process. Or, NGT could be repeated using new NGT questions on aspects of the course, e.g. what should be the aims or the content for particular subjects or electives.

O'Neil and Jackson (1983:150-1) give the following guidelines for the time taken in some of the stages when they reviewed a B.Ed. course with the teachers.

Step 1: Silent generation of ideas - 5-20 minutes.
Step 2: Round-robin listing - 45 minutes.
Step 3: Clarification - 5-10 minutes.
Step 4. Merger of items - 20-30 minutes.
Step 5: Preliminary voting - 10-15 minutes.

The above times should be taken as the minimum needed.

Conclusion

The Nominal Group Technique has a number of strong advocates. Indeed, one TAFE curriculum developer commented that it was probably the single most useful technique in his repertoire. The Nominal Group Technique appears to be suitable in situations where a group agrees that a problem needs to be solved, are uncertain how to solve it, but are willing to attempt the task. Willingness to accept the relatively rigid structure of the process, especially the rule of 'no discussion except for clarification' appears to be an important element in successful applications of NGT. Where strong task-achievement motivation is present in the selected group, the method should be effective. In situations where the problem task contains a highly charged emotional layer, the method should be approached with caution or should be presented as an exploration of the task dimensions of the problem, to be followed at a later time, by careful study and discussion of the results and, in particular, close attention to any strongly held views that were discounted by the consensus voting.

The problem with all consensus measures, including statistical analysis, is that items which may be important but which receive low scores become ignored. A review of ranking scores might, therefore, ask what was overlooked - were any important insights or solutions or alternatives lost in the ranking such that cracks or flaws which these reveal are followed up. The importance of following up minority views cannot be over-emphasised. You may have in

an NGT group one person who is actually providing very deep insights into the matter under examination; insights which may be lost in the consensus ranking procedure!

NGT, by requiring an initial, silent generation of ideas, requires participants to focus on what they personally feel is salient in defining the problem or solving it. That is, NGT assumes that the force of good ideas will carry the day through consensus as opposed to weight of argument or the position (authority) of the proposer. The central assumption is that conflict is almost certain to exist within the group and can be addressed by providing a means, the silent generation of ideas and round-robin listing of member's contributions for providing data for the group to evaluate.

Ford and Nemiroff (1975:182) concluded that while NGT appears to be especially functional for fact-finding or idea-generating tasks, the discussion group seems superior for sharing and evaluating information.

The idea of combining aspects of NGT with group discussion methods seems promising. A simple modification of the NGT procedure, which would offend the NGT purists, would be to relax the rule of 'discussion for clarification only' and, with the group's agreement, set aside a period of 'free discussion' before resuming the NGT procedure (if at all).

In problem identification applications, the problems identified by NGT can then be the basis for a Force Field Analysis to identify positive action steps. (See Section 3.4). In curriculum development applications the list of duties identified, e.g. by a DACUM procedure can be sorted by the NGT voting procedure into levels, e.g. higher (technician) level or operator level and work can then proceed at the level being addressed. In instances where the group lacks comprehensive knowledge of the occupation being analysed, some further research will be needed. The initial NGT group should be made as representative as possible.

Some things to bear in mind when considering NGT are:

- Select participants who will contribute and who have a strong motivation to address the task, that is, do not have the type of 'hidden agendas' which will lead to attempts to obstruct the method.

- Do your homework. Know the area in which you are conducting an NGT, so as to avoid being deceived if the NGT does not provide a full picture.

- Identify group leaders who will try to harness the energies of others.

- Keep your objectives in sight. Use those elements of the process which suit your purposes and discard those which do not.

- Involve those who will be affected by the results.

Finally, the method can cause frustration if applied to the wrong type of problem or is applied insensitively or in an excessively rule-guided way. The method reflects American cutlural values on achievement and efficiency. Caution is indicated when considering the method for use on groups whose cultural values are not American. Be prepared to abandon the method if things go wrong on the day by switching to another group discussion process, or possibly, a Search Conference format.

Notes:

1. The term 'proactive' is attributed to NGT because each member is 'required to write and/or articulate his/her views without the opportunity for other group members to react or evaluate until all ideas are presented' (Delbecq et al. 1975:23).

2. This type of question may better suit a Delphi process.

3.2 THE DACUM METHOD AND DERIVATIVES

Background to the DACUM method (original or 'classical' form)

The DACUM method, like the Skills/Knowledge/Attitudes (SKA) method, has its origins in the 'systems approach' to training. It is concerned with the 'what' of curriculum as opposed to the 'how' of curriculum. In this way, it is a 'task analysis' technique used for the systematic development of a curriculum. It is concerned with the identification of skills rather than concepts or understanding.

DACUM (short for 'developing a curriculum') is an approach to the development of curricula combined with an evaluation process for occupational

training programs. It was initially developed conjointly between the Canadian Department of Manpower and Immigration and the General Learning Corporation of New York. This initial development was intended to produce a curriculum guide to enhance trainee development in the program and in planning for goal achievement. Following this early effort, an 'experimental' DACUM was developed in Canada and was introduced to the New Start Corporations in Canada in 1968. It was shortly afterwards adopted by Nova Scotia New Start Incorporated which was seeking a new approach to curriculum development to enable it to respond quickly to the training needs of disadvantaged adults.

Various forms of modified DACUM have been used in Australian TAFE since the late 1970s. DACUM seems particularly suitable for use in TAFE curriculum research - evidenced by the number of TAFE curriculum practitioners who have used it in some form. As well, the emergence of DACUM from the systems approach and its concern with generating behavioural learning outcomes (Sinnett, 1974) means that it is consistent with the theoretical frameworks adopted by a significant number of curriculum practitioners in TAFE.

The writers' interest in the DACUM method is therefore stimulated by:

- its fairly widespread current use in a modified form in several States in Australia;
- its apparent consistency with the approaches to curriculum development adopted by some TAFE curriculum practitioners;
- its claimed suitability for the generation of programs which provide adult learners with an opportunity to learn in ways which suit their individual characteristics and backgrounds (i.e. is androgogical), rather than being an instructional model with pedagogical underpinnings (Adams, 1975);
- its apparent speed of execution, compared to conventional quantitative methods.

The DACUM rationale

O'Hanlon (1973:74) identifies three approaches to curriculum development and asserts that there are models which are illustrative of each approach. O'Hanlon identifies the 'management' approach, the 'systematic' approach and the 'open-access' approach. Management models are characterised by decision

making control being retained at the top of the hierarchy. Systematic models are concerned with specifying the goals to be attained and then making decisions according to educational philosophy in order to achieve these goals. Open-access models are based upon the humanist tradition and are characterised by decentralisation of decision making. None of these models stress the importance of researching the conceptual knowledge needed to perform complex work, perhaps because vocational work is seen as 'manual' work, not 'mental' work.

In reference to O'Hanlon's three models, Sinnett (1974) classifies DACUM as a 'systematic' model. As such, it first establishes the aim or purpose of the curriculum. Decisions regarding the development of the curriculum are governed only by this purpose and hence persons other than management should also be involved. A task analysis is performed carefully and each stage is evaluated in terms of whether it is furthering the original purpose. Resources are allocated only on the grounds that they help achieve the stated goals.

An overview of the DACUM method

The DACUM process as it is being reviewed here, was seen by its original developers as just a part of a whole - a whole instructional system which was specifically designed for adults in a vocational training situation. The process and product, i.e. the DACUM group workshop and the charts of skill definitions, have been extracted from the more thoroughgoing original DACUM approach of Sinnett (1974) and Adams (1975) by the writers since these are the parts that are pertinent to our research. Notwithstanding this extraction, the presentation of DACUM that follows represents the classical or original form of DACUM. A number of DACUM derivative methods have been used by practitioners in Australian TAFE - these are described later in this section.

In the DACUM process, a co-ordinator or workshop group facilitator works with carefully selected individuals who possess a range of experiences in the occupational group which is under focus. By guiding group discussion and gaining information from the group members, the facilitator builds up a skill profile of the occupational group being studied.

The facilitator prints short definitions on file cards which are affixed to a large blank wall in a structured pattern. The definitions are short, begin with a verb, and taken together should cover the entire range of activity within the

occupational group being studied. This analysis proceeds from a fairly high level (or broad range) or activities to increased levels of specificity. The degree of specificity is carefully monitored by the facilitator.

The cards can be arranged or sequenced according to an appropriate rationale such as level of difficulty, subject/module taxonomy, or the nature of the job. By numbering the completed arrangement of cards the information is transferred and transcribed onto sheets printed with blank squares. These sheets can then be used as the basic curriculum development plan and are referred to as DACUM charts. (See Appendix D.)

The facilitator

The role of the facilitator in conducting curriculum research workshops has been explored in some detail by the writers in their report entitled: The Facilitation of Curriculum Research Workshops in TAFE (1986). The reader interested in studying the facilitation role in detail is advised to consult that report. Some brief comments on facilitation are, however, noted here.

The facilitator is a key person to the DACUM exercise. The art of facilitation is best learnt by doing - initially as a co-facilitator with an expert. A DACUM facilitator should have a fairly broad academic background and possess good interpersonal skills. He/she should have experience in group handling and should have a facility with words. Experience with curriculum design and analysis techniques is also important, although a knowledge of the subject area under study is not necessary - indeed some DACUM practitioners consider such knowledge detracts from the facilitator's performance.

Selecting and orienting the workshop group

Avoid selection of participants for 'political' reasons - such people will probably have vested interests and may make the facilitator's job unnecessarily difficult. The most useful people to involve in the DACUM workshop are those who are actually performing, or supervising the job under study, or who are directly involved with the endeavour in some way. The following guidelines may be useful:

- Workshop participants should represent a cross-section of the business, industry or community grouping.

- Geographical representation should be attended to.

- Different skill strata within the target group, e.g. servicing, manufacturing, distributing, developing, selling, should be represented.

- Workshop size should not be less than six or more than about 14 - some practitioners contend that about ten is an ideal size.

- Workshop participants need to be able to attend for the full period of the workshop (generally two days) - some form of remuneration or reimbursement of expenses (perhaps even a special dinner) should be arranged.

- The composition of the group should be balanced. If for some unavoidable reason bias occurs in the representativeness of the group, then a series of complementary DACUM workshops could he held and the individual outcomes (charts) synthesised.

- Account should be taken of the participants' ability to verbalise, keep abreast of their own field and to make predictions and projections about future developments within the field.

- Contact potential workshop participants individually prior to the workshop and provide a rationale and motivation for the DACUM workshop.

- Public relations and managerial personnel who are not directly familiar with the job as it is being practised now should not be included. Teachers/lecturers have generally developed biases about how a program should be taught - and hence should not be included according to Finch and Crunkilton, (1979:115). Intending teachers/lecturers of the program being studied should be encouraged in small numbers, to sit in on the workshop as <u>observers</u> only.

- A pre-DACUM workshop session should be conducted - most conveniently at the beginning of the 2-day workshop. This should comprise a general description of the DACUM method and its rationale - some slides or a video or film are a useful adjunct.

Workshop facilities

Figure 3.1 illustrates an arrangement of the workshop room suitable for the conducting of a DACUM session. The facilities should include:

- A room with at least ten metres of plain unbroken

wall space for affixing the cards.

- Comfortable chairs, preferably swivel type with arms.

- Enough low tables or desks to line up along the complete length of the wall. This row of tables serves to separate the seated participants from the wall - it also serves as a place for charts, coffee and ashtrays. This arrangement focuses attention on the wall, but discourages any participant from leaping up and rearranging cards without the facilitator gaining consensus from the group about such a rearrangement.

- Tea/coffee should be available throughout the workshop. The workshop group should be discouraged from breaking for tea/coffee or lunch - it is best if 'sandwiches' (or the like) are pre-arranged and served in the room. Breaks in the process should be avoided lest the impetus be lost.

- A blackboard or large sheets of butcher's paper for outlining the occupational areas under study.

- A supply of felt pens.

- A large printed sign stating 'the individual/student must be able to ...' This should be fixed on the wall, fairly high up.

- A supply of file cards preferably of two different colours and sizes - e.g. 12 cm X 15 cm pink and 10 cm X 12 cm white.

- A supply of 'Blue-tack' or some other adhesive to stick the cards to the wall.

- Three 'metre' sticks with prepared spots of 'Blue-tack' already placed on. This is handy for placing cards on the wall quickly.

- Sample verb (or action word) lists taken from other charts, curriculum documents or lists of instructional objectives. These can be used if it appears that participants are having difficulty verbalising occupational skills.

- Some form of participator identification sheet listing each participant.

- The workshop location is best relocated away from the college premises to avoid such interruptions as college tours, or unwanted visitors.

A suggested sequence of DACUM steps is listed below:

- General introduction and orientation.

. Review of the occupational area.

. Identifying the general areas of competence.

. Identifying the specific skills for the first of the general areas of competence - i.e. completing the first group of duties.

. Identifying the specific skills for each of the remaining general areas of competence.

. Reviewing and refining the definitions of duties.

. Sequencing the skills.

. Establishing levels of competence for each skill in terms of difficulty, frequency and general importance to the occupational area.

. Final structuring of the chart and recording conclusions from the workshop session.

Conducting a DACUM session

The following description of the conduct of a DACUM session is presented in the sequence of nine steps listed immediately above.

General introduction and orientation

The length and concentration of this session will depend upon the degree to which the workshop organiser has been able to meet and talk to the individual participants during the planning phase for the DACUM workshop. The aspects that should be covered either before or at the beginning of the session are:

. an overview of the DACUM process so that participants understand the importance of identifying behaviours or activities rather than knowledge or concepts (hence the sign on the wall);

. provide a short resume of own (facilitator's/organiser's) background;

. provide background on the need for the program (course) under review to be reviewed - e.g. by students', teachers' or employers' complaints about existing course or technological changes;

. provide some background information on the reviewing and approving mechanisms that apply to the curriculum being examined;

- using an existing DACUM chart, explain how the profile is set up, how the learning objectives will come from the definition on the chart and how the course will be organised around it;

- emphasise the importance of the participants' contributions in developing the DACUM chart.

Review of the occupational area

It is important that participants quickly focus on the representative person they are about to analyse. They need to have a mental image of a real or proposed set of competencies possessed by some individual involved in the occupational area. This can be done by, for example, dividing the work area concerned into a number of main categories such as professional, technical, tradesperson, or operator. Encourage participants to provide the names or designations of job titles within the field. The facilitator should aim to fit these together on the chalkboard so that the whole work area is clarified. The typical mobility within the work area should be established and the single or group of occupational categories which they are going to analyse must be made as specific as possible.

Identifying the general areas of competence

Movement into this stage should be achieved as quickly as possible. For this activity use the larger of the two types of file cards that have been prepared. The facilitator asks participants to name 'duties' or broad areas of work which occupy a significant part of the time of the practitioner on the job. These duties or general areas of competence should not be specific tasks - they should be able to be broken down into specific tasks later (if not, then they do not constitute duties).

Record these duties on the cards (recording can best be done by a co-facilitator). The description of the duty should include a verb or imperative and be of the order of six words in length. Place cards as quickly as possible on the large wall in a vertical column on the right hand side. Regrouping cards and changing the wording on cards can be done any time and as often as necessary throughout the workshop.

Group the duties or general areas of competence into like groupings under headings such as supervisory, administrative, use of tools, analytical problem

solving, or the like.

Analysing the first group of duties

Choose any of the general areas of competence that appears to be fairly straightforward to work on first - e.g. something manipulative rather than analytical.

Since DACUM focuses on what work is done in an occupation, the guiding principle for the facilitator at this stage is to insist that participants make their contributions in terms of 'The individual/student must be able to ...', and not to accept contributions in terms of 'the student should know ...' or 'the student should understand ...'. Participants who persist in the latter mode need to be guided into thinking in terms of the former as the first requirement is to ascertain what is the work that an operator must be able to perform.

Once the technique becomes familiar to participants, cards with skill definitions will be produced more rapidly. These cards need to be placed on the wall from the right in line with the related duty as quickly as possible.

Sometimes the facilitator will have to help with the wording. During this stage the workshop becomes very much a brainstorming activity which continues for most of the remainder of the workshop. During this brainstorming session, participants may want to start sequencing skills (cards) and contributing skill definitions for other groups of duties. Both these divergences should be avoided.

It is important that the facilitator ensure all participants are contributing at this stage in as equal a way as appropriate because the pattern established at this early stage of the process will generally persevere throughout the workshop. As well, the facilitator needs to keep participants focused on the point and should encourage any discussions to continue as long as possible so long as they appear to be productive. The group should not break until the analysis for this group of duties is complete.

Analysing the remaining groups of duties

The facilitator continues the above process for each of the remaining duties. The sequence of tackling the duties is not crucial, but it could be wise to tackle duties requiring similar or related kinds of skills in groups. That is

to say, manipulative or hand skill duties could be completed before confronting those duties requiring analytical skills. Individual duties should be completed independently.

Definitions already on the wall can be refined or modified as the process continues, but the facilitator should insist on agreement about such changes amongst the group. However, the main concern for the facilitator throughout this part of the process should be keeping it moving as quickly as possible, and by providing guidance when the group bogs down.

Reviewing and refining the analysis

Once it is determined that coverage of all duties is complete, the facilitator should lead participants through a quick review of each of the skills and duties on the chart. The main purpose of this exercise is to improve the quality of definition of skills. No attempt should be made to restructure the chart at this time.

It is important that every card be critically reviewed individually because often participants may have refrained from disagreement at an earlier stage for the sake of process continuity, or skills may have been poorly defined due to lack of expertise earlier on in the process. This review panel should strive for group consensus on all the definitions in the chart.

Sequencing the skills

A suitable set of criteria for sequencing the skills must be developed by the facilitator/organiser and explained to the participants. In keeping with the rationale of DACUM, participants can be asked to imagine that they are the sole experts in a training situation and are responsible for organising the training schedule of a naive (untrained) student. Taking one group of duties at a time, participants are asked to sequence skills in the order that the student should learn them in order to realise an immediate return on their investment. Skills that commonly occur in the workplace would be placed first. These skills are moved to the left of the chart. As this process continues, those skills are slipped to the right where the learner would need to have developed a greater awareness of the occupation and where more complex decisions relating to skills would be needed. (See Appendix D).

Some vertical alignment of skills in groups of duties may also be arranged depending upon the course style to be adopted - for example, whether the program is modular or subject based. For example, 'safety' skills may appear in several groups of duties - if these are aligned vertically they can be readily seen to constitute a unit or module or a logical group of learning objectives. The nature and complexity of the sequencing required on the DACUM chart is variable and depends upon the selection and statement of the sequencing criteria by the facilitator/organiser.

Establishing levels of competence

This process is often conducted at subsequent meetings of teachers/educators, but may if desired be conducted as the last stage of the DACUM chart development exercise.

A simple technique for establishing levels of competence may be used - where each skill is identified with one of the three labels 'limited', 'moderate' or 'skilled' level of competence. This is considered general enough for DACUM workshop participants to agree upon and provides enough information for course developers and teachers to operationalise. A simple L, M, or S is recorded on each chart. (See Appendix D).

Final structuring of the chart

After competence levels have been completed, a final review of the chart is undertaken. Minor additions, deletions and modifications are made via consensus.

The facilitator must ensure participants are aware what will happen to the chart and how it will be used to design the curriculum. Once the chart is produced, copies should be sent to participants and to other appropriate people.

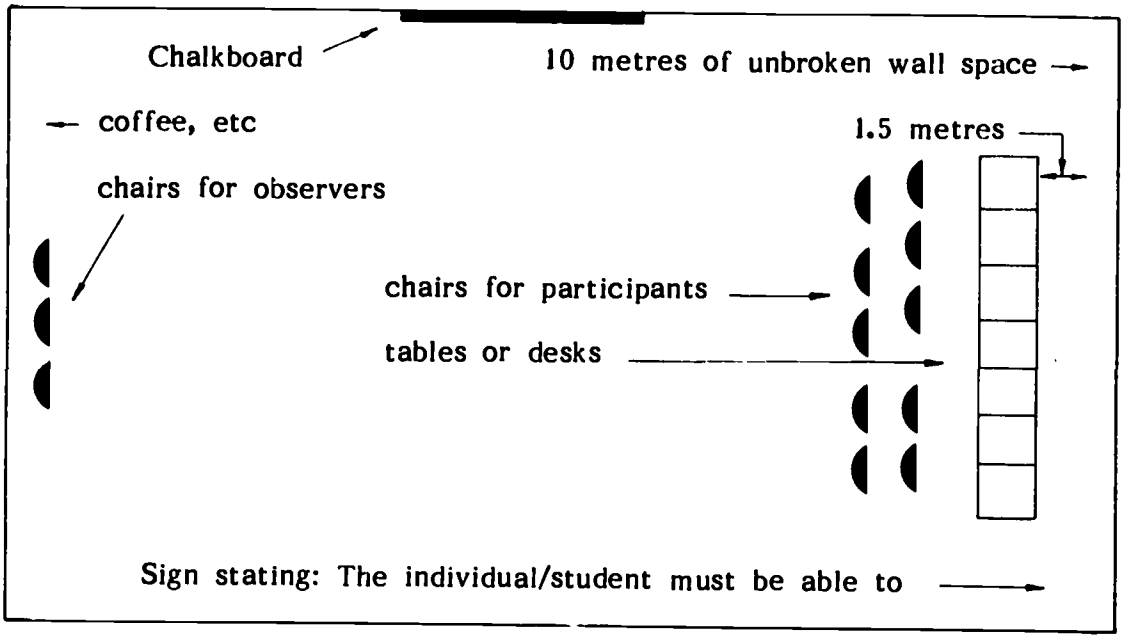


Figure 3.1 Physical layout of workshop room suitable for conduct of a DACUM session

DACUM modifications: the SKA seminar

The Skills/Knowledge/Attitudes (SKA) seminar is a group process method derived from the DACUM approach. The aim in developing the SKA method was to pare the occupational analysis process down to the minimum data necessary for curriculum development. SKA combines an occupational analysis and a task analysis. It extracts the main categories of work performed in the industry and the tasks needed to perform work within those main categories. The technique is based on a workshop using industry 'experts', a curriculum specialist and a facilitator and teachers.

The SKA's purpose is to find out what a person does on the job and what the student needs to know. The question 'what does the student need to know' is included to expand the factual (what is done) data so as to provide information about standards of performance which the student should achieve and information about the progression or sequencing of learning, though this information is collected qualitatively without using the kinds of rating scales applied in the DACUM method.

Preliminary work

Before the selection of the workshop participants is made, the question where to begin and end the process must be decided. For example, should the project cover the trade portion of the work only, or the whole industry spectrum, including knowledge of related areas or processes? Some initial exploration is needed on what the work embraces.

The workshop process

The SKA seminar involves up to 24 people chosen as representatives of the industry under investigation, working in an intensive workshop of three days duration which includes small group and plenary sessions. In the three day version the listing of main duties and the tasks necessary to perform those duties is usually completed by midday on the second day. Detailing the sub-tasks takes the remainder of the time.

The facilitator need not be a specialist in the subject area, indeed, the process is reported to work best when there is not an 'expert' leading the workshop. It is most important for the facilitator to show that the input of the group is being heard by writing all comments, non-judgementally, on butcher's paper around the wall. The facilitator can spoil the process of extracting the main duties by not sticking to the principal question: 'what does the person do', and allowing individuals to manipulate or dominate the group by convincing the facilitator that they are describing what the worker needs to know rather than describing what the worker actually does.

To build a sense of group cohesion, the group can be brought to the workshop venue, e.g. a motel with conference facilities for a meeting on the evening before the workshop, where they are given an overview of what the workshop will entail. Users of the method advise that it is most important to begin and end with the same group. People who drop out should not return. In the small group work a ratio of one teacher to five or six industry representatives is regarded as ideal.

The workshop or seminar begins with small groups working on the identification of the 'large pieces of work' (i.e. the main work categories performed in the industry). An example of a main duty for fitting and machining is 'operate a lathe'. The focus during the establishment of the 'main

duties' on 'what a person does' is achieved by the use of the phrase 'what does the person do?' not 'what does the person need to know'. After the main duties have been stated and listed on butcher's paper in small group sessions, the groups come into plenary session for the establishment of consensus. This process usually collapses the number of main duties into about eight to ten. The duties comprise various tasks which can be further divided into sub-tasks. Some sub-tasks have elements (smaller sub-tasks). The laying out of the sub-tasks, and there can be up to thirty sub-tasks, is done in small working groups of 5-6 people and usually takes about 2-3 hours. The next step is to select one or two main duties and extract the tasks that need to be known in order to perform the work within the specified main duty. The emphasis in extracting tasks is first on 'what the person does' then on 'what does the person need to know' (to perform the piece of work). This work is written up on butcher's paper.

Shortened form

The SKA process can be shortened to a one-day workshop, which ceases at the stage of eliciting duties and tasks, and leaves out detailed specification of sub-tasks and what the student needs to know.

Validation

In both the long and short form, the results can be checked by doing a survey but this is reported to be very time consuming. Another option is to conduct a survey on the final syllabus, rather than on the results of the SKA workshop.

For the SKA method to be successful, it is said to be most important to get the right people at the right time and not to use part-time teachers.

Data collation and checking

After collection of data, some data translation may be needed. This is usually done by two people, a teacher and a curriculum developer. A scalar diagram is developed which sets out the main duties, tasks and sub-tasks and, if needed, the elements which make up the sub-tasks. A scalar diagram is essentially an attempt to present data in a logical progression, hierarchy or 'tree' form, e.g. the main duties are grouped with the tasks and sub-tasks,

needed to be known to perform them. The scalar diagram is typed, then checked by a small group of say, five people, and a small survey may be conducted for verification. The process can take three months including writing a syllabus document.

Format and steps for a three day SKA workshop

Step 1. Hold a short introductory meeting over drinks the night before the workshop in which the facilitator begins by explaining 'This is what you're here for, this is what we will be doing, this is how we will be working.' The facilitator states that the major work areas of the occupation will be identified then these will be broken down into their parts. For example: for the work of hanging a picture (major area) the task level includes putting a nail in the wall, attaching a wire to the picture and hanging the picture on the wall. The next step is to ask what is involved in putting the nail in the wall (locate the wall stud). Then the question is asked 'what are the skills you want people to have, for example, in locating a stud, and what do you need to know to do that'.

Step 2 (Workshop). Work begins first on the major areas of (main) duties. Working groups of 4-5 people are used then a plenary session is convened to get agreement that they are indeed the duties. The process depends on how many duties are listed. Usually three to four quite distinct areas are named. Again, small groups are used to look at each particular duty/task area and to list the sub-tasks and, if needed, the task elements.

The timing of the process typically breaks down as follows: naming duties (1.5 hours); naming tasks (1.5 hours) and then a break for lunch; listing the sub-tasks and the task elements (7 hours).

Step 3. After the workshop, the teachers do a cleaning up of the data to get them into the right format and also to look at other background questions which might be asked.

Discussion

A problem with the SKA process which applies to the DACUM method in general is that in revision of large courses were the main body of teachers have been excluded from the workshop, the results may be resisted because the

results may not support retention of certain aspects of the current course. Yet the process is said to bring traditional subject content, e.g. mathematics, into line with what is needed by the student to perform the work. It appears that the SKA process can show up possible areas of overtraining, though tension can arise between what industry says is needed as opposed to the extra knowledge educationalists believe the student ought to have for reasons of increasing, say, problem-solving ability, mobility within the occupational field and so on. For this reason it may be useful to use DACUM as part of a blend of methods (see Chapter 4). Accounts of the SKA process indicate that the people who have participated, like it. If the course objectives are correctly written, these form the basis of assessment and teaching/learning resource development.

Two adaptations of DACUM

The following versions of DACUM have been used in Australian TAFE.

Version 1.

1. Discuss the project with representatives from the teaching body to break down major duties (at a basic level),

2. give an introduction to DACUM and allocate one duty area to each teaching college or section,

3. bring together a representation of employers and colleges in a DACUM session. The representatives in a DACUM session include a cross-section of interested parties, e.g. employers, supervisors (working in the industry), practitioners, teachers, union representatives, curriculum developers (including two people trained in the DACUM method).

4. Teachers produce a flowchart giving a profile of competencies needed for a student entering the industry, including the knowledge and skills needed. Connections between the lists of duties should be teased out (e.g. the need to be able to set priorities) and the most basic skills should be listed that go toward realisation of competency in the main duty areas. The 'main duty' flowchart lists main duties vertically and displays horizontally, the knowledge/skills needed to acquire competency in each main duty area. The arrangement of knowledge/skills groups (reading from left to right on the flowchart) can be viewed vertically to note important sequencing for learning.

5. As in the DACUM method a ranking procedure can be used to indicate the depth of learning needed. A 0-6 numbering system can be used for this, and a second numbering system can be used which gives information of levels for assessment.

Version 2

An adaptation of DACUM which has been used in Western Australia proceeds as follows. Teachers are excluded from the workshop. Their role begins when they are handed the data from the workshop. For example, for the mathematical task of 'applying third angle projection' the task statement will be provided to teachers in the form: 'Task: students would be able to apply third angle projection'. The teachers are asked to write this in a behavioural objective format, e.g. 'The student must be able to do the following...'

The teachers work through each of the tasks produced by the workshop and for each task are asked: 'Do you agree that this is what the person does?' The time allocation required to effectively teach the task is written beside the task. When all the tasks have been examined and a probable duration for teaching has been estimated the full set of tasks is examined in sequence and a total estimated time to teach them is calculated. The next step is to describe each substantive task area in synopsis form and to hand these to the subject area specialists for writing the detailed objectives. It has been stated that the detailed syllabus can be written within a matter of days. Note that the depth of treatment for each task is decided by the teachers. The final step in the process is to send the completed questionnaire back to industry for confirmation.

3.3 THE CRITICAL INCIDENT TECHNIQUE

Background

The critical incident technique was developed by Flannagan in 1947 in response to a problem of pilots losing their lives by crashing military aircraft. The technique is described in Flannagan (1954). Flannagan got together a group of pilots, those who had flown the aircraft and still lived, and asked, in essence, what do you have to do to fly these aircraft without crashing them, and what must you not do or you will crash them? That is, he was looking

for the 'do's' and 'dont's' - the sort of trial and error learning necessary for flight survival that was not in the flight operator manuals.

Ulshack (1983:133) states that the effective assessment of training needs 'should formulate a structure upon which training programs can effect a behavioural impact'. This is taken to mean that the underlying concepts on which the learning program is intended to have an impact must be formulated. The critical incident technique, he notes, 'has perhaps the most direct behavioural link of any method of needs assessment'. The method consists of a set of procedures for collecting direct descriptions of human behaviour in a relatively systematic and objective manner (Noesjirwan et al. 1979).

Such descriptions can include self-reports of recalled incidents by use of a free-ranging interview in which the person is encouraged to talk about 'critical incidents' that happened to them and the meaning that these had for them, including the effect upon them, and what they did in response (Noesjirwan et al. 1979). Descriptions can also include identification of critical problem areas and systematic identification of skills required to deal with these problems. Data from observers can be used to supplement self-reports or to identify critical problem areas and skills needed.

The outcome 'is a description of observable behaviours that are "critical" to the effective performance in a defined activity' (Ulshack, 1983:134). The method assumes that jobs are composed of critical and non-critical tasks. The emphasis on 'critical incidents' alone can be a problem. Critical incidents may emphasise the problematic at the expense of the important but routine tasks. A critical task is a completed action sequence which makes the difference between success and failure in carrying out important parts of the job. Non-critical behaviours relate to tasks which have little relation to success in securing the overall completion of the job or are done so well by workers that they are not made a source of comparison between one worker and another (Youngman et al. 1978).

The relevance of the behaviours involved in critical incidents means that the critical incident technique can be used as the basis for inferring the human qualities that are relevant to successful performance (McCormick, 1979). The method provides an 'ideal basis for the development of training programs and

training materials' (Flannagan, 1954:307). Moreover, a major contribution that the critical incident technique can make to curriculum content identification is its 'potential to deal more directly with isolating important values and attitudes" (Finch and Crunkilton, 1979:129). Using the technique 'one can select those behaviours which are attitude o value-laden and thus provide a firmer foundation for affective content in the curriculum'. 'Typically 100 to 200 incidents are gathered ... then grouped into categories with general headings.' These 'serve as a foundation for curriculum content that focuses on developing appropriate attitudes and values' (Finch and Crunkilton, 1979:129-130). Ulshack notes that where a large sample of critical incidents have been collected, a functional description of a job can be derived. The method has various applications such as 'criteria development, measures of proficiency selection, job design and purification, establishing operating procedures, equipment design, motivation and leadership, as well as training' (Ulshack, 1983:134).

Support for the use of the method for performance appraisal was provided by Levine et al. (1981:43). They conducted a comparative study of seven job analysis methods and found that the critical incident technique was 'best for personnel selection, compared with: Threshold Traits Analysis, Ability Requirement Scales, Position Analysis Questionnaire (PAQ), Task Inventory compared with the CODAP computer software package, Functional Job Analysis (FJA) and Job Elements (see Appendix A). They note that 'the critical incident technique is central in the development of job performance measures (behaviourally anchored rating scales) but that the method was the most expensive to apply'.

Zemke (1979:67) describes critical incidents as:

> reports or descriptions of behaviours enacted by people in the population being studied. These incidents are recorded and classified as effective or ineffective in achieving the desired job results. The descriptions can take the form of stories, anecdotes, reports and observations related verbally or in writing, by supervisors, peers, subordinates or any other observer qualified to judge the performance.

As noted previously, the method draws upon practical 'trial-and-error' knowledge of crucial performance do's and dont's. The gathering of 'critical incidents' can be done by observers such as researchers or supervisors or by the job incumbents themselves. According to McCormick (1979:138) the most complete form of recording includes: 1. What led up to the incident.

2. Exactly what the incumbent did that was so effective (or ineffective). 3. Perceived consequences of the behaviour. 4. Whether consequences were within the control of the job incumbent.

Ulshack (1983:135-6) gives four principles vital to the success of the critical incident approach:

> A. Only simple judgments (success or failure) are required of the observers. B. Only qualified observers - supervisors, peers or incumbents of the job - should be used. C. Incidents must represent behaviours that have consequences directly attributable to them. The behaviour can be identified as causal to the outcome. D. Specified requirements or standards for the incidents are established which might include requirements such as: (1) the incident should be observed first-hand; (2) the incident reflects aspects of the behaviour, not the individual or his personality; (3) the incident has occurred within a specified recency (e.g. the last six months).

Note that the technique's basis is observable behaviour. This is believed to maximise objectivity while reducing subjective components of inference and interpretation (Ulshack, 1983).

Main steps in applying the method

Aims

The aim of a critical incident project is to find the completed action sequences (incidents) that are critical for the performance of the job, either positively or negatively (i.e., the do's and dont's).

Critical incidents must address four questions.

1. What was done that led to effective job performance?
2. What was done that detracted from effective job performance or led to ineffective job performance?
3. What, if done prematurely, would have been more effective if done later (indicating critical problems in planning)?
4. What attitudes, values, abilities, knowledge, skills (present or absent) seemed to lead to success or failure?

2. Sample and questionnaire

The sample can be any group having the opportunity to directly observe the

incumbents performance (e.g., the incumbent, peers, supervisors). A method of data collection proposed by Ulshack (1983) is as follows:

1. **Recall.** Respondents describe critical incidents in writing or verbally.

2. **Observation.** An observer records critical incidents (do's and dont's). A 'co-researcher' approach would be useful here, where the observer and a highly skilled incumbent, together research the do's and dont's of performing the task(s). Film or videotape may assist the analysis and provide useful teaching materials. (See details on instructions for observers, below.)

3. **Interviews.** The procedure of probing for critical behavioural incidents by interview is an effective method for drawing out knowledge that an incumbent has built up through trial-and-error learning about how to perform a task effectively. Interviews can look for what is salient (critical) in performing a task and for the decision rules, in terms of do's and dont's, which must be applied to perform a task effectively.

4. **Questionnaire.** Where the respondent group is large and dispersed, a questionnaire approach may be used as in the following sample quoted from Ulshack (1983:139):

'A. Think of the most difficult situation that you have handled successfully because of your training as a veterinarian. Briefly describe the situation.

What training (specific class or seminary) helped you to appropriately respond?

How recent to the incident did the training occur?

What was the outcome of your action?

Why do you feel this was the most difficult situation you have faced?

B. Think of the most difficult situation you have handled which was unsuccessful because of a lack of (or poor) training. Briefly describe the situation.

Have you faced the situation since?

Do you now have the appropriate way of handling the situation?

How did you learn the appropriate treatment?

What was the specific outcome of the unsuccessful handling of

the situation.

How would you recommend training other veterinarians to handle the situation'.

---

3. Instructions to observers

Instructions given to observers should include seven specific items (Ulshack, 1983:140-1):

> 1. Explain the general purpose of the project. 2. Assure anonymity of the observers and incumbents. 3. Explain that an incident is an observed specific behaviour which led to a specific outcome which was either a success or a failure. 4. An effective optional step is to give observers an example of a critical incident, but make sure that the example is either positive or negative. 5. Define precisely what you want the observers to report. 6. Specify time limits, job or situation to be observed, emphasise the necessity of actual observations of behaviour, and that the behaviour should be a completed action with a result. 7. Lay out the mechanics of the collection data phase, i.e. when, where, and how incidents will be collected.

4. Data analysis

The main steps in data analysis are summed up by Ulshack (1983:142) as:

> 1. Decide the frame of reference: how is the data to be used in training; what are the training goals? 2. In the formation of categories the main considerations are: what are the critical behavioural dimensions, how do these group together, how can they be turned into descriptive statements of behaviours to be performed?

Ulshack advises that the critical data analysis be tested on independent analysts to check if any categories of behaviour are inappropriately defined.

A procedure for critical incident analysis, developed by Zemke (1976) is:

> 1. Form two groups of expert analysts. 2. Describe in writing the specific job incidents and the results produced. 3. Have the experts sort the incidents into factors, name the factors, then sort the incidents for 'goodness' and 'badness' along a 7-point scale. 4. Have the experts review the data and fill in any gaps. 5. Have the two groups swap results and reconcile any differences.

After a group of incumbents have passed through the critical incident procedure, it may be useful to hold a group discussion aimed at bringing out: general information about the work context and its relationship to task

performance, and specific information about knowledge and skills needed fc the development of an educational program. Here, the techniques offered b DACUM or NGT may be usefully applied.

5. Summary of advantages and disadvantages

Some of the advantages of the method are summed up by Ulshack (1983):

> 1. It develops behaviourally-based criteria. 2. The method is objective. 3. It takes account of the multi-dimensionality of performance and enables incidents to be categorised into a structure that should represent the natural job dimensions. 4. It provides reliable, relevant criteria. 5. It provides comprehensive information. 6. Incidents may be translated into behaviourally based performance appraisal instruments.

Some disadvantages include:

1. The role of observers. When observers are used the method requires considerable sensitivity and skill in observational analysis. The observer's role as 'watcher' may disturb respondents, especially if they feel they are being judged. The co-researcher approach mentioned previously could be useful. In this approach the person being studied is invited to become a partner in the research (hence 'co-researcher') with the curriculum developer providing key concepts, then working with the person to fill these in or to expand them.

2. The formation of categories can be time consuming in planning and implementation and does not cover routine job dimensions. Here, DACUM would appear to do a better job.

A problem which can arise with the method is how to define 'critical'. In a application of the procedure for study of teaching methods, Killen et a (1983) chose to define 'critical' as posing a need for intervention. Note that i any application of the procedure there must be careful preparation of th initial list of incidents (Grant, 1979:498).

Conclusions

The technique has promise because it brings out information about gaps i knowledge held and knowledge needed on-the-job. It is well suited to a diar approach to data collection and would appear to have application graduat student surveys which aim to assess the utility of an educational program.

The technique is flexible, relatively simple, and easy for respondents to understand. The centrality of critical incidents to the performance of tasks facilitates recall and description, since these are the events that stand out in memory. The data which the method provides are the crucial dimensions for effective performance of tasks. In the hands of a skilled analyst who will take the time to probe behind these dimensions, this data can have utility in examining the factors which shape the problems which lead to critical incidents. So, on one hand the method can lead to redesign of equipment, and on the other hand, can lead to a better understanding of how to work within the limitations of equipment. The method would appear to be useful in 'trouble-shooting' on specific problems, both technical, e.g. what are the critical incidents in performing a particular process, and social, e.g. what are the critical incidents in successful social performance such as customer relations work or staff supervision. In technical applications, due to the experiential knowledge drawn upon in identifying critical incidents and the fine-grain data which emerges, the method would lend itself to a) the development of models describing decision-making processes and b) the development of teaching strategies and materials aimed at transmitting key concepts about the effective performance of tasks.

The method appears to have wide applications in TAFE. Apart from its use in occupational analysis, teachers can use the method to review instructional methods by gathering 'critical incidents' data from students. The method also permits student self assessment (on the basis of success in performance of critical incidents) (Grant, 1979:498).

As to cost and duration, little information is yet available on TAFE applications of the method. However, in relation to cost, Levine, et al (1981), as noted earlier, describe the method as costly to apply, although they did not comment on its cost effectiveness (cost of application versus quality of data produced).

3.4 FORCE FIELD ANALYSIS

Force Field Analysis has its roots in Lewin's (1952) development of Field Theory which was formulated on the basic principle that 'any behaviour or any other change in a psychological field depends only upon the psychological field at that time' (1952:45). Lewin used the concept of 'valency' to refer to the

pull or attractiveness of an object in the perceived field. He felt that the method for solving problems should be one that sees the problem as a balance between opposing forces of attraction or repulsion. Some forces help the person's movement toward a desired state and others restrain such movement. Using these ideas, a method called Force Field Analysis has been evolved.

Force Field Analysis is a technique for 'analysing change situations' (Eiben, 1976). A force field is the total of all forces, positive and negative, that affect a particular situation. The basic notion in force field analysis has been described by Johnson and Johnson (1982) as follows:

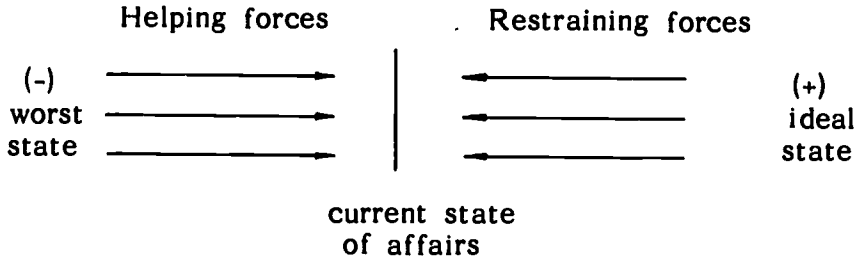


Figure 3.2 Force Field Analysis

The ideal state of affairs toward which the group is working is shown on the right-hand side of the figure by the plus sign and the worst state of affairs on the left side of the figure which is shown by the minus sign. The basic steps in doing a Force Field Analysis are: (1) In a group-setting use 'brainstorming' to develop, on a large sheet of paper, a list of the helping and the restraining forces. These should include the full tapestry of possible forces: psychological, sociological, etc. In the normal rules of brainstorming, all criticism is withheld and every member's ideas should be requested and noted without judgement. (2) The forces are then ranked according to the importance of their effect on the present situation. The strength of the forces can be depicted by the length of the arrows (Spier, 1972:113). (3) Once the important helping and restraining forces are identified, these are rated according to how easily these can be increased or decreased. The method then proceeds by taking those items which are easiest to change with a likelihood of success. The more difficult problems can then be tackled. This method helps to clarify the set of strategies which must be mounted to achieve the goal. Some strategies will focus on increasing the 'helping' forces and other will focus on weakening the 'restraining' forces. Some may work on both 'helping' and 'restraining' forces.

Main steps in applying Force Field Analysis

Eiben (1976) gives the steps in performing a Force Field Analysis as:

1. Identify the problem - in terms of the forces that provide both positive and negative impetus to its solution.

2. Ask individuals to identify as many problems or areas of concern for the problem. Identify the forces which might assist in the solution of the problem and the forces which might hinder the problem-solution process.

This can be achieved using the following guide:

Problem or areas of concern	Forces related to this problem or concern	
	Helping forces	Hindering forces
1.	1. ----------	1. ----------
	2. ----------	2. ----------
	3. ----------	3. ----------
	4. ----------	4. ----------
	5. ----------	5. ----------
2.	1. ----------	1. ----------
	2. ----------	2. ----------
	3. ----------	3. ----------
	4. ----------	4. ----------
	5. ----------	5. ----------

The next step is to form two groups of people of 4-8 members and from the individual worksheets (above) list all the problems or areas of concern. Next, identify the four or five most frequently mentioned problems and for each problem area, identify the helping and hindering forces. The final step is to rank these helping and hindering forces from most to least important.

In order to develop a program of planned change, Eiben (1976) suggests the following steps:

1. Write a goal statement, e.g. to achieve X by Y time.

2. Use Force Field Analysis to establish the forces which promote change and resist change.

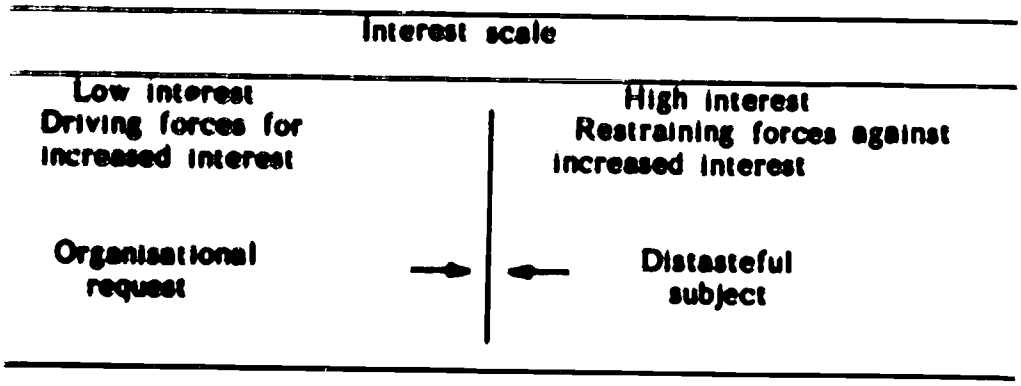
3. Identify as many resources you can relate to the

achievement of the goal (include 'Human' and 'Material' resources).

4. Develop strategies, i.e. interventions that are used by the agent of change to cause movement toward the goal - by brainstorming.

5. Implement the strategies.

Another example of how the method can be applied has been provided by Utt (1983) who used the following means for establishing the interest within an organisation for the adoption of a particular innovation.



The driving forces (organisational request) are shown at left and the restraining forces (distasteful subject) are shown at right. Once the resistances to change are listed, either the push forces can be increased or the restraining forces can be reduced, or both sides of the problem can be worked on simultaneously. Force Field Analysis 'can give some insights into the positive and negative forces which are constantly at work to either help or hinder training programs (Utt, 1981:63).

Conclusion

The concepts used in Force Field Analysis are similar to those used in the Search Conference Technique which also addresses ideal states (desirable futures) and restraining forces (constraints). Force Field Analysis would be a useful technique to apply in any workshop situation where the group becomes 'bogged down' in tension or conflict. Along with the Nominal Group Technique the method would be useful in sorting out the central issues where conflict is suspected to exist, e.g. between teachers about a course program. This method would bring out the dimensions of the problem and perhaps the solution as well.

Although not a curriculum development process in its own right, the method appears to be a useful conflict resolution procedure which can be used within a Search Conference, Nominal Group Technique or DACUM process, or in teacher workshops where conflict resolution and strategy generation is required.

3.5 BRAINSTORMING

A number of the group process methods discussed rely on 'brainstorming'. The technique of generating successful 'brainstorming' sessions is helped by observing the following steps (Simon et al. 1976:54-55).

> 1. There should be no evaluation of any kind while ideas are being thought up. 2. Everyone is encouraged to think up as many wild ideas as possible. (It is easier to tame down a wild idea, than to pep up a dull one). If no wild ideas are forthcoming, individuals are probably 'censuring' ideas. 3. Quantity is encouraged as quantity may breed quality. 4. Everyone is encouraged to build upon or modify the ideas of others. Combinations or modifications of ideas lead to new, superior ideas.

A key to success in 'brain stroming' is persistence. For example, a telephone overhead transmission maintenance problem (snow weighing down the lines threatening to break them) was solved by the three hundred and fifteenth suggestion which was to fly a helicopter over the liines to blow away the snow.

CHAPTER 4

WAYS OF BLENDING CURRICULUM RESEARCH METHODS

4.1 ISSUES RELATING TO ANALYSIS OF COURSE CONTENT

In Section 1.3 we raised a number of issues relating to the selection of research methods. These issues included: (A) Identifying the 'what' versus the 'how' of curriculum; (B) The emphasis to be placed on learning skills versus learning concepts underlying the skills, and (C) The problems of analysing future directions versus the 'here and now of work in an industry. Here we group the methods reviewed earlier according to their potential for addressing the issues listed above. In Section 4.2 we present some other promising ways in which the various methods might be used in combination. The issues raised in Section 1.3 concerning research methodology are discussed in Chapter 6.

A. Methods having potential for analysing the 'what' versus the 'how' of curriculum.

To find course content (the 'what' of curriculum) consider:

Preliminary research
Exploratory research
DACUM
Search Conference
Nominal Group Technique
Critical Incident Technique
(Or any other recognised research methods)

To find how the content could be delivered consider:

Literature search to identify problem areas and solutions.
Review of research data by teachers. If teacher workshops are used consider using the Nominal Group Technique as part of a focused group discussion and/or Force Field Analysis to generate strategies for implementing solutions.

B. Methods with potential for analysing the emphasis to be placed on skills to be learned versus learning underlying concepts.

To identify skills to be learned consider:

Preliminary research
Exploratory research
DACUM
Search Conference
Nominal Group Technique
Critical Incident Technique
(Or other methods)

Identifying underlying concepts.

Literature search. Review of research data by teachers and or/teacher workshops, possibly using Nominal Group Technique where the NGT question asks "What underlying concepts are necessary to explain how to perform skill X."
Exploratory research applied to the study of skill masters.
Use of the Critical Incident Technique.

C. Methods with potential for assessing future directions versus the 'here and now' of work in an occupation.

The three major considerations in deciding whether blends of methods are indicated are: (1) Is the occupational area relatively stable? (2) Is the occupational area undergoing change? (3) What pathway should the researchers follow in order to understand the occupational field sufficiently to know when the point has been reached for course design to begin?

If the occupational area is relatively stable consider:

DACUM
Critical Incident Technique
Nominal Group Technique (using a cross-section of teachers and industry representatives)

If the occupation is undergoing substantial change it will be necessary to identify the nature and extent of the change including skills in learning how to learn, ascertain what knowledge and skills are needed to cope with the change, and decide what format should the course have in general terms? Consider:

Preliminary research.
Exploratory research possibly leading into a Search Conference or Delphi to detect the nature and extent of change, then decide between a modified DACUM in which the participants focus in particular on skills needed to cope with change, or use a Critical Incident Technique

to identify emerging skills which skilled operators believe it will be necessary to master in view of forthcoming change. Decisions on course format could then be decided in teacher workshops.

4.2 MULTI-METHOD APPROACHES TO CURRICULUM RESEARCH

One of the more difficult decisions for a curriculum research and development team faced with a 'fast-response' brief is to decide what is the necessary and adequate information on which to base sound curriculum developer. This question depends, of course, on the specific situation. We begin the discussion of blending methods by considering a multi-method program for mounting a 'fast-response' curriculum research project.

Assuming that resources were available and that a curriculum research team consisting of one curriculum research and development specialist and two subject specialist teachers were faced with an urgent need to develop a quality curriculum product which could be well supported with a data-based argument (e.g. for accreditation or resource allocation purposes), how might the project proceed?

Remembering that we are looking at an 'ideal' program with a quality product in mind, done in a short time frame, the steps in the research program could cover:

- Listing of issues and development of research questions (2 days).
- Preliminary investigation of available information including initiation of literature search. (2 weeks: 1 full-time researcher). Note: Allow for possible delays in obtaining literature sources.
- Decide whether appropriate to survey teachers and students. (If teachers, ask in particular what they want to see changed. If students, then obtain information in particular, on what was relevant and not relevant to their on-the-job performance, obtaining relevant background information to sort this information by employee category, job performed, and so on.)
- Refine research questions for exploratory research phase (2 days: team).
- Conduct exploratory research (2 weeks: team, full-time). During this and the previous stages, key informants

with knowledge of the industry would be identified for possible inclusion in a curriculum research group process method.

- Review data and: Write summaries in point form for each research question from the exploratory interviews, review main patterns/disjunctures, decide the appropriate curriculum research group process to use, and select participants and venue (2 weeks: team).

- Implement curriculum research group process method. Note that two group process methods may be indicated: one examining the perceived impact of the future on the occupational area (e.g. Search Conference) and one examining the 'here and now' of work in the occupation (DACUM-type process), or possibly a blend of these.

- Review results to decide whether the data obtained warrant proceeding to syllabus construction and (depending on TAFE procedures) whether validation is required (2 weeks: team).

4.3 OTHER COMBINATIONS OF METHODS

This section describes a range of other possible curriculum research paths which are slanted toward the 'fast response' end of the curriculum research continuum. The methods range from the broad-brush to the specific. The thrust of the broad-brush approaches is to examine trends, dynamics, shifts and their implications for:

1. Course aims and content, including the relationship between theory and practical instruction and the weights of emphasis for, and within, subjects or units.

2. The course pattern and structure (i.e. subject grouping and duration and the sequencing of subjects throughout the course.

In a curriculum development exercise where 'fast-response' is accorded high priority, a broad-brush approach focusing on items (1) and (2) above will pinpoint any additional detailed information which is needed. Once the course concept is clearly in view a teacher-task force approach could be used to obtain the missing detail, if any.

All the methods discussed here could include a validation step such as a questionnaire administered before curriculum development takes place, or a pre-test of the course concept by use of a questionnaire or by pilotting the

course. These methods are listed below and then developed in more detail in the following sections.

Approach 1. Exploratory research (visits to 'typical applications' of the work) leading to a questionnaire.

Approach 2. Exploratory research leading into a DACUM-type workshop.

Approach 3. Exploratory research leading into a Search Conference plus a DACUM workshop held with separate participants.

Approach 4. Delphi leading into a DACUM or vice versa.

Version 1. Use of a Delphi (questionnaire, feed-back) method examining trends in relation to work processes and skills likely to be needed, leading, if necessary, to a DACUM-type workshop examining the duties and tasks performed in industry in the 'here and now', followed by curriculum development.

Version 2. Use of a DACUM-type workshop to describe the processes, tasks, skills (in the 'here and now') leading into a Delphi process to examine the likely trends in relation to current processes used. Here the Delphi questionnaire technique, or a standard (no feedback) questionnaire would be used as a form of validation which also seeks to expand the data to enable a more future oriented curriculum to be developed.

Approach 5. A questionnaire leading to a Search Conference.

Approach 6. A Search Conference leading into a DACUM-type workshop with different participants.

Approach 7. A Search Conference/DACUM-type workshop blend.

Approach 8. A combination approach aiming at a more thorough occupational analysis.

Approach 9. Observational studies of highly skilled operators in key work areas. (See Appendix C).

Approaches 1 to 8 will now be discussed in more detail. In considering blends of methods the reader should keep in mind the utility of the Critical

Incident Technique for assessing conceptual and practical knowledge needed for successful job performance and the utility of Force Field Analysis for resolving conflict and for generating action strategies for implementing or change. These methods can be woven into any multi-method mix. Note that many combinations of research methods are useful to suit specific situations.

Approach 1. Exploratory research leading to a questionnaire.

In this method, exploratory research is used to develop a course proposal which is tested on the industry. For an example, see Anderson (1985) for which study the questionnaire was in three parts: Part one addressed work processes and applications, part two addressed knowledge and skills needed on the job, and part three comprised a 'pre-test' of tentative course proposals.

Step 1: Clarify issues and draft 'research questions' (broad questions which will be probed during interviews (e.g. 'How is new technology altering the pattern of skills needed to perform the work?' 'How is the industry structured (how is the work divided within the industry)?'

Step 2: Conduct interviews exploring the set of research questions and other matters that arise and observe work performed. Sampling cases are as many 'typical applications' as are needed to obtain a cross-sectional view of the occupation. The limit of cases may be as little as 4-8 in a small, specialised work area). Add such extra cases to the sample as needed to obtain a picture of the diversity of the industry. **Step 3:** Simultaneously with the exploratory work, the main features of a possible educational program would be worked out. These ideas are developed for course structure and content described in terms of educational outcomes. **Step 4:** Prepare a questionnaire examining:

- the types of work in the industry and processes and equipment used;
- the knowledge and skills needed to perform the work;
- the (draft) course proposal, described in terms of aims, outcomes, patterns and duration, and, indication of the demand for such a course.

Step 5: Refine the initial course proposal, develop curriculum and if needed, pre-test.

Approach 2. Exploratory research leading into a DACUM-type workshop.

The purpose of this method, in addition to generating useful data, is to prepare the facilitator of the DACUM-type workshop by providing him/her with necessary information about:

- the diversity of the industry;
- the future trends and how they are affecting the pattern of skills and knowledge which will be needed by the student to perform the work;
- the main competencies needed;
- the essential or main tasks for which knowledge and skill training should be provided;
- other information relevant to the curriculum development project which was not known at the outset.

The facilitator can now vary the DACUM-type workshop rule that the facilitator does not make an input by switching at appropriate times to the role of a workshop member and (gently) probing any strongly held views which do not accord with the facilitator's knowledge derived from the exploratory work: in essence, it would mean taking a 'devil's advocate role'. A problem with this method, if a teacher performed the facilitator role, is that vested interests may become woven into the workshop output or be thought to have done so, posing problems for acceptability of the data to the teaching group. The sampling strategy could be to cover 'typical' applications of the work, interviewing staff at various hierarchical levels.

Approach 3. Exploratory research leading into a Search Conference plus a DACUM workshop held with separate participants.

The data from the exploratory phase would be summarised in terms of common themes. The issues identified would be used to design the Search Conference agenda. The purpose of the Search Conference would be to assess future directions that the industry is taking and the implication of these for education. The importance of this step is to ensure that the DACUM process will not miss emerging skill needs. The DACUM would also supply the detail on knowledge, skills and attitudes. Using separate participants for all phases, exploratory work, Search Conference and DACUM, would give a wider

cross-section of views. The opportunity to compare 'search' and DACUM output for the same industry would aid evaluation of these methods.

Approach 4. Delphi leading into a DACUM or vice versa.

Version 1. Delphi leading into a DACUM.

Step 1. A monitor group comprising a minimum of one curriculum developer and one subject specialist conduct a Delphi process with a group of industry experts. The Delphi process would explore and obtain agreement from industry 'experts' about what changes are likely in the future and how these changes will be likely to affect the pattern of work and the training needs of the industry or parts of the industry and also to identify those parts of the industry which are likely to remain relatively unchanged. An 'expert' would be defined as anyone who is in a position to offer an informed view about the industry. Experts need not be employed in the industry; however, the final sample must include industry personnel at various levels, e.g. planners and/or administrators, marketing specialists, supervisors and others as indicated by the research questions. The time frame considered in this phase would be the short term, e.g. the next five years, although the longer view might also be considered.

Step 2. The questionnaire prepared by the monitor group would ask for perceptions related to a few key questions covering specific categories of the work of the industry, e.g. machinery, materials, processes, and management/supervision. The following questions are intended as general examples to illustrate the method.

1. What are the main changes which are likely to take place in the (INSERT WORK CATEGORY) within the short-term future, e.g. in the next five years?

2. What are some of the likely effects of these changes on the pattern of work and/or skills required to perform the work?

In answering, please focus on training needs.

Alternatively, a more specific form of question can be asked which lists existing materials and/or processes and asks for a ranking of the suitability of the item as either 'outstanding', 'acceptable' or 'not acceptable' to the intended

use, within a nominated time frame, e.g. the next five years. For this type of question to be relevant, some exploratory work would first be needed. The two methods for doing this are: (1) The teacher(s) conduct plant visits of a cross-section of the typical applications of the process and work being studied or (2) A DACUM workshop could be conducted to establish the main duties performed by operators and the processes used. With this alternative the DACUM data would then form the basis of the Delphi questionnaire. That is, a 'search' would then be conducted on the DACUM data with the aim of ascertaining which work processes and attendant knowledge/skill areas are likely to undergo significant change in the future.

Step 3. The monitor group would analyse the Delphi responses and return the results to the original expert group for further comment or expansion. At this stage the group may be asked to rank the pooled perceptions in order of importance or likelihood. This 'feedback' process would be repeated a second or third time and would end when consensus appeared to have been reached.

Step 4. At the completion of the Delphi procedure, decisions would be made as to what methods would be used next. For example, a DACUM workshop (or workshops) could be used to develop curricula for those areas of industry which appear relatively stable. Another method, such as the Search Conference method, could be used to develop the course aims, course structure and topic content for courses designed to accommodate future shifts in the industry. The central principle underlying such courses would be their flexibility in meeting future needs within the industry.

Version 2. DACUM leading into a Delphi process.

Here the Delphi questionnaire technique, or standard (no feed-back) questionnaire would be used as a form of validation of the DACUM but would also seek to expand the data to enable a more future oriented curriculum to be developed.

Approach 5. Questionnaire leading into a Search Conference.

A short questionnaire would be devised to obtain basic descriptive data about work done, by whom, and at what stage of training (or whatever is appropriate). This information would then be used in planning and conducting a Search Conference.

Approach 6. A Search Conference leading into a DACUM-type workshop with different participants.

Step 1. Conduct preparatory work (begin listing issues, conduct a literature search and so on).

Step 2. Identify key informants for participation in the conferences: For the Search Conference, select participants to achieve a cross-section of informed views about the area to be searched, including management and practitioner-level industry participants, and other stakeholders. (Total: 25 to 35). For the DACUM-type workshop, select practitioners and include students selected from each stage of the course. Include, say, 10-15 practitioners from industry, six students and two or three teachers who will design the curriculum. (Total: 18 to 22).

Step 3. Conduct a Search Conference. The purpose of this conference would have four aims: The first would be to explore the forces that will shape the future of the industry so that the course aims, content and depth of treatment of the content would result in the student obtaining the type of knowledge and skills which will be needed upon graduation. The second would be to state the thrust of the course aims or to produce the course aims in a more final form. The third would be to list the main subject areas which should be included in the course, giving some indication of scope, depth and weight of emphasis. The last aim would be to describe the essential resources needed for the course to be run successfully.

The conference would begin with a 'future scan', then do a brief historical review of the main turning points in the evolution of the industry and in the provision of education. It would then cover 'strengths and weaknesses' in the current educational system and conclude with development of overall course aims and a priority ranking of subject areas to be included with a statement of the resources needed for implementation.

Step 4. Conduct a DACUM-type workshop. The purpose of this workshop would be to examine the work currently performed in the industry in terms of: main categories of work performed; the tasks/knowledge needed to perform work within these main categories (including the sub-task level, as appropriate); and the knowledge, skills and attitudes needed to perform the tasks or

sub-tasks.

Step 5 Data analysis. The data analysis phase would entail a synthesis of the results of the Search Conference and DACUM workshop by considering the gap between the future (Search Conference data) and the 'here and now' (DACUM data), with the aim of producing a future oriented educational program and the resources needed for its implementation.

Approach 7. A Search Conference/DACUM-type workshop blend.

Step 1. Conduct preparatory work (issues clarification, literature search and so on).

Step 2. Identify workshop participants (aim for representative course-section of stakeholders).

Step 3. Conduct a two-day workshop as follows:

(a) Future scan (2 hours). Examine the main forces impinging on the area.

(b) Historical reconstruction (1 hour). Examine the main turning points in the work, its processes and the history of educational provision within TAFE. (This is to give credit to the original decisions about training and also to allow these decisions to be seen as having taken place within a context which has now changed.)

(c) Examine current strengths and weaknesses (1 hour).

(d) Examine the industry at the present time. Apply DACUM process, extracting the main duties, tasks and sub-tasks, needed to be known to perform the main duties. This process is intended to lay out the work of the industry in sufficiently fine detail to enable the next step to take place.

(e) Relate the DACUM data to items (a), (b), and (c), and refine the DACUM data by addition, deletion or allocation of weights of emphasis in the light of future trends (2 hours).

(f) Decide the main thrust of the overall course aims and the main requirements for structure and content. (The extraction of main themes may be done in a plenary session) (2 hours).

These groups would be asked to prepare the main features of a course 'for

the future', not just one for the present. The working groups would be asked to consider first the ideal course, then to consider those constraints which are hindering the ideal, and, in particular, to nominate any resources constraints which must be overcome if effective educational provision is to be realised. In their final submission to the plenary session the working groups would be asked to indicate the features of an ideal course but at the same time to concentrate on a course which is a balance between the ideal and the present reality. The conference would end at this point to review the data.

Approach 8. A combination approach aiming at a more thorough occupational analysis.

Assemble a converging program as follows:

(a) Conduct an exploration by industry visits, interview and observation of 'typical applications' of the work. Decide on the number of interviews needed according to the diversity of the work, and achieve at least one visit to each 'typical' application. (Note: This is an add-on or 'snowball' sampling strategy which can be started at any point in the sample population with cases being added on as the picture of the work diversity emerges.)

(b) Simultaneously with the exploratory work:

- Identify key informants for the proposed workshops i.e. draw up lists of possible participants for Search Conference or DACUM workshops.

- Conduct information search (literature, industry, forecasts, syllabus documents, related work in progress.)

- Begin extracting issues to be addressed. For example, list data on industry trends, data on strengths and weaknesses in the course, industry views of 'need' and 'demand', and form a picture, from the industry visits of a course (described in terms of overall aims and essential subject areas), which might constitute a line-of-best fit, i.e. accommodate industry diversity whilst providing the essential theory and practical knowledge. (Note: This means that broad-brush course design work could begin during the exploratory phase. The course (aims, content, scope, depth) will become questions to be explored, refined and validated thro gh later phases of the project.

- Identify further work that should be initiated. For

example, should the exploratory work (and possibly the initial broad-brush course ideas) be turned into a questionnaire at this stage? Decide whether detailed observational studies should be done of highly skilled operators in the key work areas in order to ascertain the top level of knowledge and skills required in these key areas? (See Appendix C.)

- Conduct workshops (Search Conference or DACUM-type).

- Decide on validation procedures. For example, trial a questionnaire based on exploratory and workshop data with or without refined course proposals, on the original sample of 'typical' applications plus the firms represented by the workshop participants, i.e. the workshop participants hand the questionnaire to respondents at all relevant levels within their organisation.

- Run preliminary data analysis. Decide whether to conduct a full-scale questionnaire survey and, if so, whether to begin syllabus drafting using the full-scale questionnaire results for fine-tuning; or whether to delay syllabus drafting until all data are in.

- Develop curriculum.

CHAPTER 5

THE IMPLEMENTATION OF GROUP PROCESS RESEARCH METHODS:

THE ROLE OF THE FACILITATOR/GROUP LEADER

5.1 INTRODUCTION

Gathering qualitative data using curriculum research group process methods places the facilitator (or group leader) in a crucial position in relation to quality of the workshop output. It is therefore important to understand the facilitator role in the implementation of curriculum research group process methods. This section is a summary of a study of the facilitation of curriculum research workshops (Anderson and Jones, 1986) which examined how a group of experienced TAFE curriculum developers planned and conducted group process methods for TAFE applications. These approaches were analysed in terms of the value orientations (preferences for things and actions) and social rules (guides for social behaviour) found to be effective in conducting successful curriculum research workshops in TAFE. The intending workshop user may wish to refer to the above mentioned study for more detail about the complex skills required to conduct group process methods and for an explanation of the concepts of values and social rules. The main findings from that study are summarised below.

5.2 GENERAL STAGES IN CURRICULUM RESEARCH WORKSHOPS, AND VALUE ORIENTATIONS AND SOCIAL RULES APPROPRIATE TO EACH STAGE

Table 5.1 gives a general picture of a curriculum research workshop in terms of the main stages and steps, and the values and rules appropriate to each stage. It is not meant to relate to any particular curriculum research group process method but to highlight the general principles which should be addressed when designing and implementing curriculum research group process methods. The data on which the table were based were derived using a modified Delphi process (eliciting value orientations and social rules used in the conduct of curriculum workshops), followed by a two-day seminar exploring the complexities of the facilitator role. This method of leading into a workshop/seminar from a Delphi questionnaire had two advantages. First, it was an excellent 'warm-up' procedure for getting participants to think about

the issues. Second, it gave each participant a look at what the other respondents saw as the important dimensions of the facilitator role.

An important point to bear in mind about the concept of social rules is that rules can be made, broken and renegotiated (Harre and Secord, 1972). Rules for making and breaking the rules of curriculum research and development workshops depend on the curriculum research methods being used and on the situation in which they are being applied, i.e. on the dynamics of the seminar itself. The philosophies of curriculum research methods differ but, in implementation, they share as common ground the skills of working with people in groups. The purpose of Table 5.1, therefore, is to show the common themes for working successfully with people in TAFE curriculum research workshops. These themes or value orientations are as follows:

A **humanitarian focus**

Although facilitators vary in the way they approach the task work of the seminar or workshop, they appear to be very person centered in their approach and attend closely to the personal needs of the workshop participants. It appears that when personal needs are fulfilled the task work flows with greater smoothness.

A **task-oriented focus**

A good facilitator achieves the task through making the aims, expectations and outcomes of the workshop clear, attending to individual and group needs sensitively, defusing and/or resolving conflict, watching the use of time and using control where appropriate.

An egalitarian focus and avoidance of 'power-tripping'

A good facilitator avoids 'power-tripping'. This is important because The facilitator possesses a degree of power which, unless handled sensitively, can have damaging effects. This power can be expressed in an autocratic, overbearing manner used in an attempt to impress the group, or by adoption of a judgmental manner (God-like pose), or by showing insensitivity to the needs of participants and to what they are saying, or by driving the group too hard. These manifestations of 'power tripping' create distance between the facilitator and the group. In attempting to avoid the negative expression of the power

inherent in the role, facilitators adopt a humanist, caring approach, take care to negotiate the program and any changes with the group, and create the conditions that allow the groups energies to be released and the guidance to allow then to work effectively on the task. The egalitarian value adopted by facilitators is revealed in the rules of treating all participants as equals, valuing contributions equally, transmitting empathy, and making decisions by consensus.

A leadership focus

Facilitators appear to adopt the conception of a leader as one who sets clear directions, is flexibly responsive to group and individual needs, and is prepared to step aside when the workshop momentum is progressing well.

The ability to motivate groups

Facilitation requires an ability to generate, unlock, or inspire energy and interest within the group. The means for achieving this are by careful design of the workshop and selection of participants, the adoption of the values and rules embodied in the first two themes mentioned above, together with the transmission of enthusiasm about the worth of the project, transmission of positive expectations about the outcome, the display of faith in the group (e.g. through valuing group contributions), and a preparedness to adapt the process to the needs and interests of the group (by being sensitive and perceptive of group and individual needs).

Good facilitation requires excellent searching and communication skill

Searching skills include the ability to tease out the issues beforehand, including the politics and 'hidden agendas', the implementation realities and problems which bear upon curriculum development, and the ability to plan the workshop accordingly. Communication skills include the ability to listen carefully, particularly to the 'music behind the words', and to be clear and succinct.

These themes are taken up in Table 5.1 which shows the general stages and steps in the evolution of curriculum research workshops, and the values and social rules which appear appropriate to each stage. The skills listed below are important in striving for the ideal of a democratic leadership style.

TABLE 5.1

STAGES AND STEPS IN CURRICULUM RESEARCH WORKSHOP PLANNING AND IMPLEMENTATION AND FACILITATORS' VALUE ORIENTATIONS AND SOCIAL RULES (SUMMARY)

Stages and steps	Value orientations/action guides
Stage 1: Planning	
a) Research the issues	Know the background. Extract the the issues. Know the politics (the 'hidden agendas') affecting the project brief or likely to generate tension within the workshop. Understand the issues and problems which will affect implementation of the outcomes.
b) Get aims clear	Know what the sponsor wants. Know what you are going to do in the workshop. Be able to communicate this clearly.
c) Select or design workshop	(See Table 1.1 for questions which guide selection of various methods.) Know the method thoroughly. Be able to explain the method clearly and succinctly, including its 'ground rules'. Be prepared to be flexible in implementation. Know where you can bend the rules. Have contingency options.
d) Choose participants carefully	Get the 'right' people for the job, i.e. those in a position to know the area being studied. Choose participants with a good cross-section of knowledge/skills/awareness.

Stages and steps	Value orientations/action guides
e) Check out, set up venue	Aim for comfort, ease of interaction. Allow for socialising.
THE WORKSHOP	
Stage 2: Orienting participants to the task and how it will be achieved (the method or process)	
a) Welcome participants	Be friendly. Put people at ease.
	Begin building 'team spirit' and group cohesion.
b) Explain aims/task/ process/outcomes	Brief and orient participants to the planned process. Be clear and brief in explanations.
	Help people to 'see' where they are going.
c) Check out participants' expectations	Listen carefully (throughout the workshop). Show that you are listening. Be open. State your expectations. Indicate what is able to be changed and what is not. Respond sensitively and perceptively to group and individual needs. Defuse tensions early. Set up a supportive atmosphere. Value all contributions equally. Do not be authoritarian. Avoid 'power-tripping'. Attend to any problems which participants have in regard to the process being used. Be prepared to shift tack (be flexibly responsive to group and individual needs). Use consensus to make decisions.
d) Participants acquire skills and knowledge about the process	Participants need to understand the process in which they are participating. Teach the required skills to the participants, if necessary.

Stages and steps	Value orientations/action guides
Stage 3: Build momentum	
	Attend to any problems which participants have in relation to the process being used. Let the group set the pace. Adjust the rules to the group. Make decisions by consensus. Do not value the task over people's needs. Maintain group cohesion. Lead by enthusiasm. Create a feeling of energy. Encourage participation. Be skilled in getting information from the group. Don't be intrusive but draw out silent members. Handle confrontations when they arise, sensitively and tactfully. Avoid emotional roadblocks to communication.
Stage 4: The workshop in 'full-swing'	
a) Plenary (whole group) sessions.	Be prepared to step aside if the group is working well, i.e. has 'matured' to the task. Be prepared to change direction if th group becomes bogged-down. Assert control where appropriate. Attend to 'people needs'. Watch participants' comfort needs. Monitor time use. Schedule breaks when appropriate. Maintain group spirit and cohesion. In th task work, the ... tor may be more demanding (not satisfied with partial solutions). Monitor time usage.
b) Small group sessions	After the group leaders are selected (preferably by the group), ensure that they and the group understand the task.

Stages and steps	Value orientations/action guides
Stage 5: Concluding the workshop	
a) Summarise	Summarise the workshop findings.
b) Achieve closure	Leave people with a sense of accomplishment.
c) Get commitment	Get commitment to outcomes (especially important with the Search Conference method).
Stage 6: Follow-up	Document and distribute reports of the workshop to participants.

5.3 DESCRIPTION OF THE GENERAL STAGES IN CURRICULUM RESEARCH WORKSHOPS

We will now trace the model through its various stages, amplifying a number of key points.

Stage 1: Planning

Research the issues

It is vital in the planning stage to research the issues. It is important to know the background to the relevant issues and to have a general idea of the different backgrounds, interests, motivations (and factions) among the participants and therefore an idea of what information may come from the group and what tensions might arise. Clarify the aims of those commissioning the project and the project objectives. Talk to experts before the seminar. Try to find out what are the central issues at the structural level of the occupation, e.g. legal requirements, trade union concerns such as demarcation issues, and the issues at the student level. Is mobility within the occupation important? This requires the ability to liaise effectively with a variety of groups. Check the previous history of the project. Without this knowledge the appropriate workshop process cannot be selected.

By knowing the issues, a good facilitator can lead a group into exploring

these issues or can pick up important issues which are below the surface or are hinted at by subtle cues. Moreover, the facilitator is in a better position to bend the rules to address key issues and to bring to the surface such 'hidden agendas' which might, if opened up, clear away obstacles for the implementation of the workshop outcomes or modify the program to accommodate them. The concept of 'hidden agendas' refers to those plans and motives that remain hidden but which can exert a powerful effect especially on the assessment of recommendations. Doing your 'homework' is vital for successfully eliciting relevant information from the group.

Get the aims clear

Knowing the issues enables the facilitator to get the aims of the workshop clear and to communicate these to the group. Groups can wander off the track and might require reminders about the aims. Participants also need to agree on the aims. Not only does the facilitator need to be a good persuader of others but also to be flexible in adapting the workshop process to the aims of the program and the needs of the group, first, by choosing participants wisely and second, by accommodating the group's wishes.

Select or design the workshop

Some key questions which guide selection of workshop types have been listed in Section 1.3. The essential decisions appear to rest primarily on whether a sufficient understanding of the nature of the industry or activity for which a curriculum is to be developed has been gained through preliminary investigation and/or exploratory research. Assuming that this has been done or the necessary knowledge is possessed, then the selection of group process methods might take account of the following points:

- The question of whether the occupation is relatively stable or is undergoing change. If it is undergoing change, consider Search, Delphi or NGT group process methods. If it is relatively stable, consider DACUM. If the situation is complicated, consider a blend of methods (see Section 4.3).

- Questions of whether the implementation difficulties are paramount. If so, consider Search or NGT group process methods.

- The question of documentation needed for accreditation.

Since group process methods rely on a relatively small sample, it may be necessary, especially if large sums of money are involved for curriculum development and implementation, to use a multi-method approach (see Chapter 4) and to follow this with a questionnaire for validation.

A central concern for planning a workshop program, is to fit the program to the aims of the curriculum research project. Have a clear structure or structures planned, but feel free to modify them in the light of the group's needs or to vary the activities to allow change of pace. Include 'report-back' segments where members of the group provide feedback to others (so that the pool of information generated is available to the whole group) and give opportunity for discussion and interaction. Include activities which cater for group maintenance (i.e. allow the group to work as an enthusiastic and united group and allow participants to contribute to the process where particular tasks can be successfully completed). Note that, in general, flexibility in design and implementation of the workshop is a central rule in curriculum research workshops.

For Search Conferences, design the agenda carefully. Although the agenda/process for each Search Conference has the same format, they should be tailor-made to a particular group. Time constraints may apply and may require compressing two or more steps. Give an indication of timing on each stage as many participants are time-oriented. Plan Search Conferences to allow time at the beginning where there can be careful attention made to the expectations of the participants. For a DACUM workshop have the workshop follow a good rhythm, of around four main tasks per day, not lots of bits and pieces.

Choose participants carefully

Draw together a group of persons who are respected for their individual knowledge and ability, including being leaders in their field and good workers. Find out what each participant can offer in terms of specialist knowledge and interests. Make sure participants are telephoned beforehand and that the invitation is confirmed by letter.

Check out, set up venue

Make sure the venue is comfortable, includes appropriate workshop space and

a separate area for socialising, and arrange for the necessary facilities, such as refreshments and clerical/typing support services, and resources. Visit the venue before you finalise your choice. Arrange the room to maximise group sharing and group unity, i.e. put chairs in a semicircle, rather than in rows facing the front.

Stage 2: Orienting participants in the workshop

Welcome participants

Start in a low-key manner, introduce yourself and others briefly, explain your role, thank people for coming. Explain the importance of the workshop.

Explain aims/purpose/roles/tasks

Explain the purpose and goals of the workshop, preferably in writing and repeat this at the start of the workshop. Be clear on what you are trying to do. Set realistic goals for yourself and the group. Where appropriate, provide background information to the participants before the workshop. If you think it is necessary, explain any alternative action which might be used to achieve the workshop goals, In particular, state what is open to be changed and what is not, but be prepared to negotiate with the group. Develop contracts with participants in the workshop in relation to their responsibilities, and clearly outline the outcomes expected from the workshop.

Check out participants' expectations

Attend closely at the beginning to the group's needs, especially the need to get to know each other and to resolve any uncertainties about the process in which they will be engaged. Clarify participants expectations (and state yours). Listen carefully to the exact words or nuances people use.

Participants acquire skills and knowledge about the process

It can be useful to provide an introductory training session at the start of the workshop to simulate key aspects of the task which participants will be asked to perform in order to ensure that all participants have the necessary skills and understanding and to generate a 'group' feeling. The facilitator may need to teach the skills which are required by the group.

During the workshop, when specific problems emerge which need to be solved, the facilitator must make the problem-solving task very clear and, preferably, display the task in writing. Here the facilitator's role is to help people to 'see' where they are going.

Stage 3: Building momentum

Provide motivation and support

The aim of the facilitator is to successfully sustain the interest and involvement of the group. This can be achieved in part by establishing a positive climate, using sensitivity and tact, and leading by generating enthusiasm. Encourage a sense of pride in, and ownership of, the product of the group interaction.

Create a supportive atmosphere in which individual and group inputs are valued. The facilitator who is gentle and caring with people, can put a group at ease. Show sensitivity to individual and group needs, and avoid alienating people.

It is important not to force opinions on others and to keep task and people needs balanced. Do not let the task predominate over people or people overtake the task. Provide regular encouragement and positive feedback to the group. Demonstrate confidence but do not be dominant. Transmit positive, open expectations but try not to colour the outcome with one's own views, i.e. guard against transmitting one's expectations as to what the outcome will be. Instead, transmit enthusiasm that there will be a successful outcome. When the facilitator is not a task expert, he/she should display confidence about the process, but be tentative about the task content (listening carefully to the views of the expert participants).

Work toward group cohesion

Promote cohesion and keep the group united but active. A way of working toward group responsibility and the achievement of creative solutions is to encourage self direction and responsibility by the group. Draw out silent members but do not put anyone 'on the spot'. Encourage the group to identify solutions which suit them. Accept procedures determined by the group and, in particular, adopt procedures which meet the emerging needs of the group.

Momentum can be stifled if group emergent needs are not responded to sensitively and perceptively. Be prepared to change direction if the group becomes bogged down, and to liaise with the group to achieve the goals or tasks. Allow the group to grow and to set its own pace. Watch to see if anyone is expressing dissent non-verbally with what is being said. Be prepared to step aside if the group dynamic is flowing and relevant. Keep the momentum going. Do not be intrusive or tie the discussion down, or let anyone else tie it down. When using small group sessions within the workshop, it is helpful in promoting group cohesion, allaying anxiety and pooling knowledge, to get the groups to report to each other at various times. Encourage self-direction and responsibility.

Ensure participation

A key to good facilitation is to ensure that all participants contribute to the workshop. Elicit responses from silent members. Make comments that are supportive and encouraging. Try to acknowledge all input as contributing to the total effort. Value all opinions equally - forget status and position. Watch carefully to see that people are not being cut off by other group members or are being excluded from contributing. Draw people out. Make it easy for them to contribute. Accept all comments initially (regardless of quality) so that a fair hearing of suggestions occurs. Allow equal time for comment. While trying to involve everyone be careful not to put anyone on the spot. Try to ensure equal participation in an unobtrusive fashion. Work toward stimulating effective group interaction and participation.

Maintain focus

Keep the focus clear by relating all new tasks to previous ones answering 'what for' questions as they arise. Be task oriented and persistent in gaining task information. This requires having a good concept of what is the task. But value peoples feelings over the achievement of the task.

Use consensus

Decisions of vital importance to the group and participants should be reached by consensus. Whenever you change the task or the pace, allow opportunity for clarification and or dissention. Face and attempt to resolve conflict. If conflict is serious and cannot be resolved within the workshop,

schedule a break and take the protagonists aside to see if the conflict can be resolved in private discussion. Then, when the session resumes, state what agreement if any was reached and see if this is acceptable to the group. If the workshop has to be abandoned, at least the major obstacles to course development will be known. If serious conflict is anticipated, this should be examined before the workshop is conducted.

Stage 4: The workshop in full-swing

A. Plenary (whole group) sessions

Step aside if the group is working well. Be prepared to shift direction if the group becomes restless or bogged down. Keep the task down to manageable proportions. Ask questions for clarification. If unsure, summarise what you understand about what has been said and seek confirmation as to its accuracy. If you spot an anomaly, hand it back to the group for clarification. Do the same if anyone asks a question which the group should answer. When writing down other people's ideas do not paraphrase unless you have checked most carefully with the originator of the idea on the accuracy of your version.

Get feedback

Provide opportunities for and encourage feedback from participants about everything. Allow diversions to the program only by consensus. Avoid long report-backs. Monitor use of time.

Share the leadership role where appropriate

Give opportunity for other participants to take the leadership role where appropriate. Do not allow anyone who is less skilled than yourself in facilitating the task to take over from you unless it is planned.

Allow time for refreshment breaks and socialising

Have frequent breaks, especially at critical periods in the workshop (when participants become tired or look like becoming bogged down or too tense). Have light lunches and allow time for socialising.

B. Small group sessions

Choose group leaders according to the needs of the seminar. Get group leaders to meet frequently during the session. Familiarise group leaders and seminar co-ordinators with the area under consideration, the procedures for running the seminar, the broad areas in which information might be obtained, and the timetable. Spend time to ensure that the group understands the task.

Stage 5: Concluding the workshop

Summarise at key points

Summarise the process at key transition points. Set up process checks (i.e. check participants perceptions of how they are feeling about the process). Get clear about what the participants expect and want. Establish if you have commitment to proceed.

Achieve closure

Closure must be ensured. Closure is achieved, for example, by summarising important points so that people feel that they have something to take away. Get closure on a workshop by reviewing the aims or expectations and summarising the workshop achievement. Thank the participants and praise where praise is due.

Value achievement

Leave people with a sense of accomplishment. Make sure some concrete action is decided.

Follow up output

Document and distribute all agreements, meetings, etc. Follow up the output of group with further research as needed.

Skills required by facilitators

This section summarises the skills required by the facilitator.

Communication skills

The facilitator needs a high level of skill in communicating effectively.

This requires, among other things, the ability to have an open mind and to listen carefully and actively. One way of doing this is to show that you are trying to follow what people are saying and that you value what they are saying. Maintain eye contact with the person who is speaking. Be sensitive to the verbal and non-verbal cues from the group.

Make the relevance of activities clear (in relation to the overall task). Avoid jargon and be precise. Have an open mind.

Be tolerant, respectful and appreciative

Acknowledge the views expressed by participants even though they may not be personally acceptable. Be democratic. Value people for themselves. Avoid put-downs. Indicate that you respect participant's expertise. Be prepared to invest time in dealing with emotive issues so that they do not waste even more time later. Allow anyone to intervene at any time and acknowledge their concern, especially when you do not immediately act on it. Indicate your willingness to be interrupted.

Be casual, relaxed, open and sincere

Be casual, relaxed, low-key and concerned to put group members at ease. Be open to others. Answer questions frankly. Say what you are doing and why you are doing it. Be seen as fair minded, i.e. to seek other views without passing judgment. Keep formality to a minimum. Be honest and sincere in interactions with group members (do not work behind a facade).

Transmit empathy

Try to see things from the other's perspective: to stand in the other's shoes. Try to blend in with the group (including style of dress). Do not be seen as aloof.

Be friendly and supportive

Be friendly, supportive, encouraging and warmly responsive to people. Be attentive.

Adopt a quiet, confident and non-defensive manner

Be quiet (i.e. not dominant or authoritarian), and project a confident manner

and a sense of direction.

Be fair Show appreciation of contributions. Be seen as fair minded.

Be flexible: Adjust the process and the rules to the group and be alert to individual, group and organisational needs

Adjust the workshop process to the aims of the meeting and to the needs and pace of the group. Pick up important issues raised by the group. Allow regular time-out from the task work to examine the process (by which the task is being achieved) and correct any problems. Value the group's efforts in this regard. Since there may be conflict about the process itself, allow questioning of the process. Bend the rules or change the direction or style of operation according to the situation.

Be aware of the importance of the groups feelings and pick up group issues and suggestions

Feelings are an important source of information. Be sensitive to the mood or feeling within the group. Have the ability to handle feelings and confrontation well (e.g. by defusing potentially tense confrontations between participants which is important in overcoming emotional road-blocks to communication). Conflict can be an important indicator of an underlying problem, which may relate to how a task should be approached and, if addressed tactfully, can allow the group to become productive.

Work toward shared understanding

Work toward a clear, shared understanding with the group.

Show faith in the group

Trust people to take responsibility for their own learning. Communicate, verbally and non-verbally, very positive messages about the outcome. Try to inspire interest and create a feeling of energy.

Use control when appropriate

Deal with dissent or resistance immediately it surfaces - listen especially carefully as there may be a misunderstanding which you can clear up or you may be doing something which needs to be put right immediately. Notice

when tensions are starting to arise and defuse them, e.g. using humour to lighten the situation or by introducing a break in proceedings. Just acknowledging the tensions may sometimes be sufficient.

Counter productive aspects of facilitation

Several destructive aspects of facilitation are summarised below.

Power-tripping

Avoid being overbearing, dominating, too directive or autocratic. Do not sit in judgement on the views expressed, or indicate that alternative ways of going about the task are a poor choice or override individual participant's needs. Do not try to impress the group with knowledge. Do not push the group to your solutions or push the group too hard.

Failure to provide clear direction

Do not give confusing instructions, set unrealistic goals, allow aimless discussion or let the process continue unmonitored.

Failure to motivate groups

Do not allow participants to become restless or dissatisfied, allow reporting to go on and on, make comments that are negative or critical, engender group hostility or resistance to learning, or break the flow of the group.

Lack of sensitivity, insight, care and consideration of people and their feelings

Do not over-emphasise the task over peoples needs. Don't leave people wondering what is wrong with themselves. Do not cut people down.

Conclusion

The foregoing shows that considerable skill is needed to effectively facilitate or lead a curriculum research workshop. This is especially the case when conflict situations arise, hence planning is important.

There is a need to learn more about how conflict can be handled not by choking it off or sweeping it away but recognising it, working with it, and

trying to find solutions which relate to the goal of achieving quality and relevance in the curriculum. The facilitator must be able to recognise irreconcileable conflict for what it is and abandon or postphone further work until the conflict is resolved.

CHAPTER 6

SOME METHODOLOGICAL ISSUES IN THE USE OF GROUP PROCESS METHODS

6.1 ISSUES ASSOCIATED WITH RESEARCH METHODOLOGY

In Section 1.3 these issues were listed as (A) the relative strengths of qualitative versus quantitative methods, (B) the problem of sampling bias, (C) the involvement of educators and practitioners in the research process and (D) the question of who controls the workshop output?

A. Strengths of qualitative versus quantitative methods

Some problems with the use of quantitative methods were discussed in Section 2.2, in particular (1) the problems of selecting a representative sample when the industry is large or not clearly defined, (2) the question of how useful is the data when the response rate is poor, a problem which does not become known until after a considerable investment in time has been made, and (3) the problems of translating a fragmented view of work done in the industry (e.g. data on tasks done by how many) into an instructional design. This, it was noted, is usually a subjective process liable to bias.

Qualitative methods, on the other hand, usually suffer from lack of cases to support the conclusions reached. Offsetting this is the strength of qualitative methods, when properly used, to do a better job of describing the issues to be taken into account in course design. However, this too can be a matter for debate. There are strengths and weakness for both qualitative and quantitative methods. Qualitative methods and group process methods in particular appear to be faster and particularly suitable for course revision where the extent of demand for places is known. In starting up a course in an entirely new area the size of the enrolment demand probably should be assessed using quantitative methods, particularly if arguments must be presented about the costs of implementing the course.

Qualitative methods work well when considerable expertise already exists among the educators and the main questions with which they are concerned are

the larger issues of

i) Thrust (i.e. course aims).
ii) Scope (what should be in or out?)
iii) Weights of emphasis (where should these lie?)
iv) Sequencing (what should come before what?)

When the larger questions are known, it becomes easier for the educationalists to pinpoint their knowledge gaps and to move to plug these, i.e. through industry visits, study of equipment manuals, staff development and so on.

As noted in Section 2.2 qualitative methods can be used to account for the patterns resulting from quantitative analysis and so to round out the picture given by quantitative analysis. For example, qualitative analysis can explain why a group of skills is important whereas frequency analysis merely says how many people are performing the skills. Questionnaire methods as used in curriculum research largely reflect the limitations of the knowledge of the designer. Qualitative methods are informed less by a notion of expert knowledge already held and more by a questioning approach: 'What am I missing that I need to know?', 'Where must I look next?' then, 'What quantification do I need to show how important are the various spheres of work in the industry under study, from the viewpoint of designing the curriculum? This orientation makes qualitative methods particularly suitab' as a prelude to questionnaire design where the main purpose of the questionnaire is to count occurrences of skills that the more free ranging qualitiative methods have shown are in demand so that, in the first instance, the data can be related to the broad instructional design questions listed in items i) to iv) above, and in the second instance, to questions of emphasis to be placed on learning skills versus learning underlying concepts.

It has also been noted (Anderson, 1986) that when teacher group sessions are held on how to restructure a course, it is much easier for them to work on data of the kind enumerated in i) to iv) above, than to wade through a statistical print-out of frequencies of tasks done by how many. When speed is of the essence, this is of considerable advantage. Fine tuning can then take place when the course is implemented as it is only when a syllabus is tested in the classroom that some of the problems to do with the transmission of skills and underlying concepts can be resolved.

B. The problem of sampling bias

Qualitative methods, when they rely on only a few cases such as when 'typical applications' sampling is used or on a small number of participants when group process methods are used, are particularly subject to sampling bias. The problem of sampling bias can be viewed from a number of perspectives.

One way of viewing how bias can be introduced is to use a social class perspective. Given that group process methods enjoin a group of people with a professional-managerial class background in designing curricula for people with essentially a working class background, one might ask: "What are the social class interests of the former that may become woven into the curricula for the latter which may not reflect their (working class) interests? The DACUM process, looked at from this perspective, may do a good job of developing curricula to teach working class people to be good operatives but not good managers because management is not seen as the preserve of the working class. In times of rapid technological change one might ask: 'How useful is DACUM in teaching skills related to how to manage change? Or do any curriculum research methods allow workers to have a say in the educational implications of the introduction of new technologies with their attendant problems of 'de-skilling'? In this connection, among the group process methods, the Search Conference method at least mixes employers, educators, practitioners and students in the curriculum research process.

Another form of bias is that which can result from the psychological dynamics at work within group process methods. Perhaps the most serious of these psychological dynamics concern the getting of consensus. The pressure on participants to conform to the consensual in a group setting can be quite strong, especially when a view is strongly put by people of high status such as a major employer. The advocates of the Nominal Group Technique claim that their method is expressly designed to avoid such influences. Researchers who have studied the Delphi process, particularly Weaver (1971) note how the push toward achievement of consensus can influence responses of the Delphi panel. In the Search Conference approach, the role of the facilitator is especially delicate as it is easy for the facilitator to be especially powerful in sidetracking conflict issues in the belief that attaining consensus is more

important.

C. The involvement of educators and practitioners in the research

In our view it is essential to involve educators in the research process. Where this has not been done, e.g by use of a DACUM process which excludes teachers, there has invariably arisen strong resistance to the curriculum which teachers are then asked to implement. The Search Conference method includes educators and practitioners. With the Nominal Group Technique it has been suggested by Hegarty (1977) that teachers should review the results of the NGT workshop before implementation of the results. This is also advocated for the DACUM method (Lyons, 1984).

D. The question of who controls the workshop output

This is very much concerned with questions of who owns the curriculum: the institution which offers it or the client? The Search Conference method, as previously noted, joins educators, practitioners and students in the research process and has an added advantage, the action groups, for following through on issues raised and solutions generated. The preferred solution to this issue, in our view, is to involve both teachers and students in the research process and, if that is not possible, to ensure that the teachers will have an opportunity to review the workshop output. This also makes good sense from a research point of view: the teachers may spot something missing.

6.2 CONCLUSIONS AND FUTURE DIRECTIONS

Some conclusions from the study are:

(a) the importance of completing sound preliminary investigation;

(b) the need to use multi-method approaches which address questions of occupational structure and change at the broad level, in relation to course aims, scope, depth and course structure, and questions of specific competencies needed in order to produce quality curricula without obsolescence;

(c) the value to be obtained in using the methods described in combinations which exploit their strengths and, therefore, strengthen their weaknesses;

(d) the importance of enhancing the skills of curriculum

developers in the use of group-process methods;

(e) the need to obtain comprehensive case study data on applications of the methods described in order to assess cost, time, expertise needed, and the quality of data produced.

Where do we go from here? Speaking about the pursuit of an 'ideal method' for job analysis, Levine et al. (1981:51) note that one limitation of current job analysis technology is its relative inability to deal with the job as it should be, rather than how it is now, and with the job's changes over time.

Throughout this study we have drawn attention to the importance of using two levels of data analysis. One level addresses occupational structure and change and the other addresses individual educational needs, keeping in mind the student's need to learn how to cope with the future changes in technology and career.

There is probably no 'ideal' method. However, a promising question to pursue would ask what is the ideal blend of methods? To answer this question we need empirical results from imaginative blends of methods. There is a need for detailed documentation of the methods, especially exploratory (qualitative) approaches, the Search Conference, Delphi and the Nominal Group Technique, and preferably in comparative studies between States. We need to know more about the strength of these methods in TAFE applications. We also need to know what wording of questions works best with Delphi and NGT, and what research questions work best with exploratory methods.

A number of promising combinations of research methods have been identified such as joining Search and DACUM, Delphi leading into DACUM and possibly the Search Conference Method. Linking Delphi and Search, while controversial with Search advocates (in the Search Conference rationale the participants are the 'experts' rather than outside 'experts'), would overcome a weakness of Search. This weakness is that the participants, although they may be in the key vantage position to deal 'expertly' with implementation realities, may not be so expert on 'futures' impacting on the present. Industry forecast data derived via Delphi could be given to Search Conference participants beforehand as briefing notes for reference. However, the introduction of 'expert' commentary into the search process is controversial according to some Search Conference devotees. Nevertheless the search process appears to be

weakened if poor data on trends emerge in the 'future scan' phase.

On shorter projects, a promising method is to spend time, following the preliminary investigation, on exploratory (qualitative) research addressing occupational structure and change with a view to defining the main thrust of the course (aims, content, sequencing, course structure), and then either move directly onto curriculum design where fine detail questions are left to the syllabus writers to answer as needed, or follow with a questionnaire. This approach, with the addition of a questionnaire to provide back-up validation and expansion of the exploratory research, has been tried successfully and is suitable for small amounts of teacher release, e.g. 8 hours per week spread over a period of two or three terms.

The conduct of curriculum research group methods is a complex skill. While most workshops run smoothly, difficulties have been reported with problems of conflict within the group due to factional split. We suspect, although this has not been reported in the literature, that difficulties can arise in workshops with the definition of the aims of the process. Conflict may not be voiced but may be expressed by passivity - an unwillingness to contribute. Since sample sizes are necessarily small, one or two people not responding can skew the results. Note especially the effort which skilled group leaders put into encouraging full workshop participation. It is not recommended that curriculum developers unfamiliar with group process work leap in head-first. It is recommended that they either do a trial run, sit in on a group process method, or at least have a co-facilitator (partner) to help with the recording.

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APPENDIX A

DESCRIPTIONS OF SOME QUESTIONNAIRE METHODS

Introduction

This appendix describes several types of questionnaires developed for job analysis.

The Position Analysis Questionnaire (PAQ)

The PAQ is a structured job analysis questionnaire consisting of 189 elements of a 'worker oriented' nature. It aims to identify and measure the underlying structure of the various components of work (Smith and Hakel, 1972). Youngman et al. (1978) describe the PAQ method as a factor analytic approach giving the following five broad dimensions of work: having decision-making, communication and social responsibilities; performing skilled tasks; being physically active/related environmental conditions; operating vehicles/equipment; and processing information.

The Job Components Inventory (JCI)

Banks et al. (1983:57) have developed a new job analysis technique which takes about one hour to administer. The technique involves examining the use of tools (covering 220 tools and pieces of equipment); the physical and perceptual requirements (23 items including strength, co-ordination, dexterity, reaction time and selective attention); mathematical requirements (127 aspects of mathematics including elementary algebra and trigonometry with practical applications such as work with plans and drawings); communication requirements (22 items dealing with preparation of reports and letters, use of coding systems, dealing with complaints, receiving written communications and other features of interpersonal relations), and decision-making and responsibility requirements of work (9 items covering decisions about methods of work, order of work, standards and related issues).

With the aim of measuring agreement between job holders and supervisors, and assessing discrimination between occupational areas, job titles and organisations where the dependent variable was the total number of components

used by each job holder, section by section and in total, the method was tested on four job titles from engineering work (grinding machine setter/operator, drilling machine operator, milling machine operator, and semi-automatic lathe operator) and four job titles from clerical work (rating clerk, library assistant, mail room clerk and shorthand typist). Banks et al. (1983) reported a high level of agreement between job holders and supervisors. As would be expected, they found significant differences between JCI profiles of office and engineering occupations and between job titles in the occupational areas. The method reflects the variety and range of requirements of these particular jobs. For example, clerical work was found to require a wider variety of tools and equipment and to utilise more mathematical and communications components than engineering, but the two work areas did not differ significantly in perceptual, physical and decision-making requirements. They conclude that 'the JCI generates occupational components common to a wide range of jobs which could form the basis of broad based training or for a "core" curriculum, depending on the jobs studied' ((1983:64).

CODAP

The CODAP program (Comprehensive Occupational Data Analysis Program) is a suite of computer programs for analysing occupational data. Goode (1981) describes the process as placing prime importance on data about individual work positions taken from the job holders themselves. The crux of each survey questionnaire is the job inventory: a list of all the tasks which could be expected to be performed by any of the personnel working in the occupation being surveyed. A task is a 'specific unit of work which can be described using a single verb'. The tasks in the inventory are grouped into duties, a 'duty being a broad category of work involving a number of related tasks'. Each questionnaire makes provision for the respondent to score each task against a numerical scale.

Background information is gathered which includes data about the individual and about the job in general. These variables include rank (the method was developed in the Armed Services), employment category, experience levels (such as time in rank, time in employment category and time in present job), courses completed, types of equipment worked on and tools used, and questions about job factors which are essentially morale indicators and include the demands the job makes on the incumbent.

The most important or 'primary' factor is time spent on each task. The CODAP program then uses these ratings to compute an estimate of the percentage of working time which the individual spends on each task. Secondary task-factor data are collected using a survey instrument based on the same time-spent data. The respondents rate each task on the relevant factor against a scale provided, and the arithmetic average of all raters' ratings on each task is taken as the measure of the factor for that task.

The respondents are normally required to rate all tasks in the inventory rather than only those which they personally perform. Other secondary task-factors include task difficulty - the time needed for an individual to learn to perform the task adequately; consequences of inadequate performance - a measure of the seriousness of the probable consequences of inadequate performance of a task; and the task delay - a measure of how much delay can be tolerated between the time the worker becomes aware the task is to be performed and the time he or she must commence it.

In order to tap a broader knowledge of the entire occupation being surveyed, the first line supervisors are used as raters. The CODAP program also provides a statistic indicating the reliability of the measures obtained, including information which identifies a rater who may not have followed the instructions properly. The CODAP program can display the secondary task factor information beside the primary factors of 'percent performing' and 'percent time spent'. Goode (1981) sums up the CODAP program as being a 'powerful tool for providing information which can be used in determining training requirements'.

The CODAP method benefits from the possibility which exists in the Armed Services of 'mustering' respondents and directing them to complete the inventory with the aim of achieving a near 100 percent response rate. Moreover, it is not clear at this stage whether the CODAP program provides a means of data analysis which is not available on any of the main-frame computers, e.g. Statistical Package for the Social Sciences (SPSS), Genstat, or any of the Multivariate Analysis of Variance programs.

Functional Job Analysis Technique (FJA)

The FJA technique is described by McCormick (1979) as 'both a conceptual

system for defining the dimensions of worker activity and a method of measuring levels of worker activity'. He cites Fine and Wiley (1971), who described the characteristics of Functional Job Analysis, as follows.

> 1. Functional distinctions must be made between what gets done and what workers do to get things done. 2. What workers do, insofar as their job context is concerned, they do in relation to three primitives: Data, People and Things. 3. In relation to each primitive, workers function in unique ways. Thus, in relation to things, workers draw upon physical resources; in relation to data, on mental resources; and in relation to people, on interpersonal resources. 4. All jobs require the worker to relate to each of these primitives in some degree. 5. Although the behaviour of workers on the tasks performed by them apparently can be described in an infinite number of ways, there are only a few definitive functions involved. Thus, in interacting with machines, workers function to feed, tend, operate, or set up; and in the case of vehicles or related machines, to drive-control them. Although each of these functions occurs over a range of difficulty and content, essentially each draws on a relatively narrow and specific range of similar kinds and degrees of worker characteristics and qualifications for effective performance. 6. The functions appropriate to each primitive are hierarchical and ordinal proceeding from the simple to the complex. Thus, to indicate a particular function, (say compiling data) as reflecting the requirements of lower functions such as comparing and excluding the requirements of higher functions such as analysing (McCormick, 1979).

The FJA approach provides for the analysis of jobs in terms of two worker function scales, namely, the level and the orientation of involvement with the three hierarchies (data, people and things). The level of involvement is indicated by the specific function of each hierarchy that is considered to be applicable to the job in question. The level of involvement of the worker is expressed in terms of a percentage applied to each of the three functions (data, people and things). For example, for a task in the social welfare field which requires the worker to fill out a standard interview form and which entails asking questions, listening to responses, and writing answers where some leeway is allowed as to the sequencing of the questions, the functional job analysis for the task would break it up as follows:

Area	Functional level	Orientation
Data	Copying	50%
People	Exchanging information	40%
Things	Handling	10%

Note that the heading 'orientation' refers to the proportional relationships of the function to the three areas (data, people and things). Other scales which have been used with the FJA method provide for characterising each job in terms of worker instructions, reasoning development, mathematical development, and language development. Another important point about the process is that in writing task statements the action verb is modified by the means (tools, methods, equipment) required by the immediate objective of the action (if different from the result expected from the action), and by some indication of prescription/discretion in the worker instructions (McCormick, 1979). By modifying the action verb in task description, the FJA method appears to offer an expansion of the treatment of action verbs used in the DACUM method.

APPENDIX B

SEARCH CONFERENCE ON FUTURE DIRECTIONS

FOR TRADE EDUCATION IN GRAPHIC REPRODUCTION

B-1 INTRODUCTION

This review of the NSW TAFE Graphic Reproduction Trade Course aimed to set the broad directions for trade education in graphic reproduction, with particular focus on questions of course aims, course structure, main content areas and, the larger questions associated with subject sequencing.

The data collection phase included two linked steps: (1) exploratory industry visits which included observation of a cross-section of applications of contemporary Graphic Reproduction technology and (2) the conduct of a Search Conference on 'Future Directions For Trade Education in Graphic Reproduction.'

Use of these methods, together with a series of teacher workshops to translate the data into a revised curriculum, enabled a major reconstruction of this trade course to be implemented in one year from commencement of the review.

The project was carried out by Mr Bob Snedden and Mr Graeme Murray, teachers of Graphic Reproduction. Curriculum consultancy was provided from Directorate of Studies, NSW TAFE (see Anderson, 1986).

The steps in the implementation of the project were

STEP 1. Preliminary discussion with the Head of School.

STEP 2. Detailed discussion with the teachers released for the project to review issues and formulate research plan.

STEP 3. Discussion of the research plan with key decision makers of the school (the Consultative Team).

STEP 4. Conduct of exploratory industry visits.

STEP 5. Report of preliminary findings to the Consultative Team. Decision

ratified to use a Search Conference procedure as the next and main data collection method.

STEP 6. Conduct of Search Conference.

STEP 7. Report of results to Consultative Team.

STEP 8. Formal involvement of the teaching staff in the curriculum development process via a series of teacher workshops and individual and group submissions.

STEP 9. Review of teacher input and development of syllabus.

The essence of the consultancy model outlined above was involvement of decision makers within the school in all planning decisions and in review of the results from each planning decision. From the outset it was agreed that (1) the major focus of data collection would be on the broader questions of course aims, scope, weights of emphasis and subject sequencing, and (2) that the research plan would be flexible; the decisions as to what main data collection procedure to be used would be made after the exploratory work had shown what was the best way to proceed. The involvement of the general teaching staff began after the Search Conference. The rationale for this was that it would be a more efficient use of the teachers' time if they were involved after data was available on what industry viewed as the direction that the course should take.

B-2 CONFERENCE PLAN

The facilitator introduced the conference as 'an examination of future dire ns for trade education in graphic reproduction with the aim of deciding (1) what should be the thrust of the course (i.e. the broad aims), (2) what should be the scope of the course, in terms of what should be in and what should be out, (3) what weights of emphasis should there be on the various content areas, and (4) if possible, what should come before what (i.e. sequencing)'. Throughout the conference, participants comments were recorded on large sheets of paper which were displayed around the walls of the room.

The actual sequence of questions used in the conference varied from the original agenda because the participants were reluctant to divide into small working groups. The program evolved as the conference proceeded and is

summarised below.

DAY 1: Evening session 5.30 to 9.00 p.m. with meal break at 7.00 p.m.

1. What will Graphic Reproduction be like in 5-10 years time? (FUTURE SCAN PHASE)

2. Looking back over the 'future-scan', what patterns are apparent? (List.)

DAY 2: 9.00 a.m. to 4.00 p.m.

3. What are the current strengths and weaknesses in either the trade course or in employer's practices in relation to training?

4. What knowledge is needed by trade students? (General scan of required knowledge.

5. What are the characteristics of an 'ideal' graphic reproducer in view of future trends/changes? (See Note 1 below.)

6. List the major areas in which knowledge is needed now and in the next five years time?

7. For the course in Graphic Reproduction, what must be emphasised overall? (See Note 2).

8. What computer skills are needed and where must the emphasis lie?

9. Brief session on: "Where do we go from here', including how the data would be used, and concluding remarks.

NOTES: (1) After a a general review of knowledge areas which the course should cover, a suggestion was made by one of the participants that the characteristics of the 'ideal' student should be listed. This was very effective in presenting an integrated picture of the type of graduate which industry participants believed would meet the needs of the emerging technology.

(2) Most of the participants had a detailed knowledge of the current course and some had direct responsibility for supervising apprentices.

B-3. COMMENTS ON THE SEARCH CONFERENCE

The use of an abbreviated Search Conference duration of ten hours rather than the more typical three day format was influenced by the belief that industry representatives would be hard pressed to find three full days to spare. In truncating the conference, the objective was to strip the method down to its minimum essentials, whilst attempting to retain those elements which encourage the involvement of the participants which is claimed to be a strength of the method. Those elements are: (1) the inducement to 'lateral thinking' provided by commencing with a 'future scan' of trends and forces affecting the occupation and (2) the encouragement of equal participation and of the group contributing to the way in which they will work toward the goal. Participant involvement was indeed generated: the conference formed into such a cohesive group that efforts to induce them to divide into smaller working groups as intended, failed, necessitating a change in the conference agenda.

Experience of the group dynamics in this particular conference allows some issues in the conduct of short Search Conferences in curriculum applications to be noted. The Search Conference facilitator needs to be nimble and able to adapt the process, on-the-run so to speak, according to the types of issues emerging and the subtleties in the group's interaction patterns. This is not for the unprepared. As noted in Section 2.2 the underlying philosophy of 'searching' must be understood. This requires an understanding of the Search Conference philosophy which rests primarily on the notion that the participants, not the facilitator, will define the direction which the conference will take. It also requires an understanding of the principles of exploratory research. Moreover, a considerable demand is placed upon the facilitator of such conferences to adapt the conference format in ways that participants see are relevant and to obtain their consent on what work they will do next, whilst keeping the conference on track as far as curriculum development purposes are concerned. In this Search Conference it was necessary for the facilitator to rapidly scan the output from each segment while participants were taking a refreshment break and evolve a pertinent focus question for the next segment.

When devising focus questions, avoid the temptation to anticipate what the group might be ready to do in two hours time. Until the group have agreed to work on a particular focus question, then probed it in the ensuing group session, you will not be in a position to know what the next focus question

could be.

Some of the more difficult questions in planning a Search Conference include how to choose the right people and how many to invite. Around thirty participants is considered ideal. The question of whom to invite is dependent on the research aims. To generate a good 'future scan' requires that participants be in a position within their organisations to relate changing technological and social patterns in the market place which affect the demand for the firm's goods and services, to the expertise needed within the firm for it to remain competitive. The ideal Search Conference participant, therefore, is one who is closely attuned to the requirements for technical skills within the firm, is engaged in a management level capacity in monitoring changing patterns in marketplace demand, and is contributing to the continual adaptation of the firm to meet these changes.

If participants are carefully selected, then the conditions for successful group interaction will be present since participants will be able to see how other people in a similar position are grappling with the complexities of the industry the 'external environment' (to use Search Conference phraseology). These complexities are an inherently interesting dilemma for managers and it is hard for them to resist being drawn into the type of discussion which takes place during the 'future scan' phase of a Search Conference.

Planning for the number and type of participants should anticipate a 5 to 10 percent drop-out due to last minute work pressures on industry representatives. It is especially important to be able to replace drop-outs at the last minute. The technique could be used of pairing participants according to the segment of the industry which it is desired to represent, as achieving a good cross-sectional representation from industry is crucial to the quality of data generated. Accommodation and catering must be flexible in case all who are invited turn up.

It appears that in cases such as Graphic Reproduction where the industry grouping was relatively homogeneous, the method does have potential for drawing out the main trends and issues and enables this information to be available quickly - in a matter of days - for curriculum development purposes. The shortened form of Search Conference as used here does not leave sufficient time for producing fine detail on tasks and performance levels.

APPENDIX C

OBSERVATIONAL STUDIES OF HIGHLY SKILLED

OPERATORS IN KEY WORK AREAS

This method could provide the research information for curriculum development in an appropriate occupational area, preferably a small, knowledge intensive area, or could form a part of a combinatory approach.

The method entails an intensive study of skill masters working in key phases of a process, whether in an industrial or a service area. It requires a 'co-researcher' relationship to be established between the curriculum developer and the skill master. In this approach, both parties contribute to the method by which information will be obtained. The curriculum developer would supply concepts from the social science area including research procedures derived from occupational research methods such as the use of the Critical Incident Technique or application of theoretical insights into the nature of problem-solving expertise.

The purpose of the study would be to explicate the theory knowledge (i.e. knowledge 'how') as well as the practical knowledge/skill (i.e. knowledge 'that'). The principles entailed in problem-solving for the particular work function would be drawn out, together with such other trial-and-error based knowledge which enables a broad view of the work function to be developed. The method would need at least two observation/interview sessions with each key operator and may be augmented by other methods such as the keeping of a diary by the job holder.

The sampling strategy would be to select as many key operators as is needed to obtain a picture of the general work area. Use of a tape recorder and/or videotape recorder could become part of the developed course.

When used in combination with other methods, this approach would be seen as an ideal, exploratory tool. Alternatively, where a DACUM method is used first, it would identify the key functions in each main duty area. Validation of these key functions would be carried out by a study of 'skill masters'; a study which is very likely to add useful detail.

The method would require a high skill level in the curriculum developer. Where the curriculum developer is joined by a teacher, this could constitute an excellent staff development project for the teacher.

APPENDIX D

A DACUM CHART FOR JEWELLERY REPAIR WORK

A completed chart for jewellery repair work is shown below. The nine duties or general areas of competence are set out on the right hand side of the chart. The skills, which arise out of the DACUM session analysis of the duties, are set out on the left of the duties.

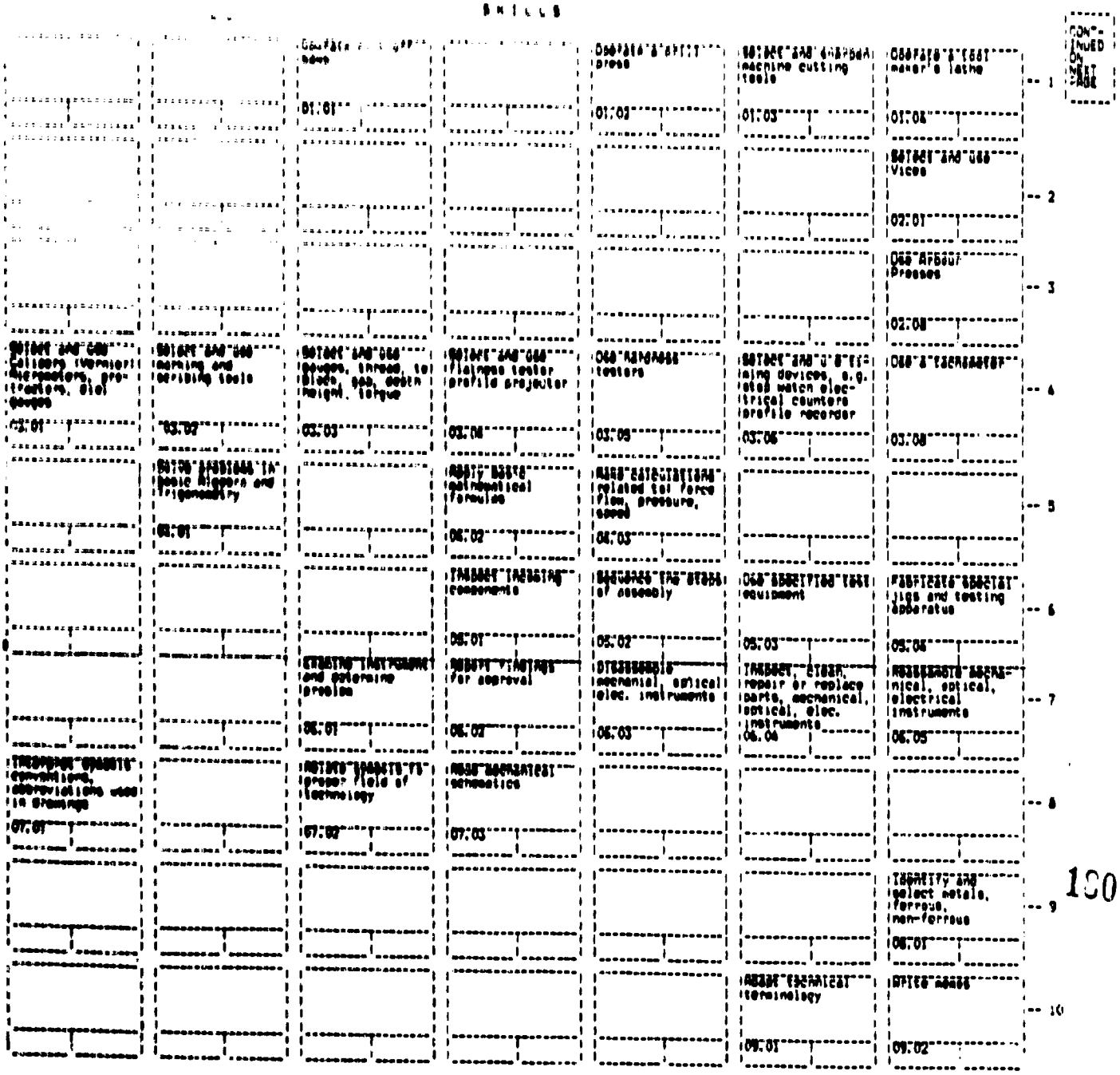
The left-to-right sequencing of the skills are an indication of the order in which the student should learn the skills. The vertical alignment of skills would be used depending on the course style to be adopted - for example whether modular or subject based. In any case the vertical alignment of the chart is an indication of those skills that need to be learned at about the same time.

The square box space next to each skill number (e.g. 02.13) can be used if desired by the course planners for the inclusion of either L, M or S. L means 'limited' level of competence is required; M means 'moderate' level of competence is required; S means 'skilled' level of competence is required.

(NOTE: To assemble the chart depicted on the following two pages, copy and assemble by joining the two pages according to the number coding 1,2,...,10.)

APPENDIX D

A DACUM CHART FOR JEWELLERY REPAIR WORK



APPENDIX D (CONTINUED)

CONTINUED FROM PREVIOUS PAGE	SKILLS (CONTINUED)							DUTIES (or General Areas of Competence)
1	Operate a milling machine: vertical and horizontal 01.05	Operate 2 and 3 dimensional pantograph 01.06	Operate Jewellers latne 01.07	Draw simple sketches of required parts 01.08	Design simple jigs and fixtures 01.09			OPERATE AND MAINTAIN MACHINE TOOLS 01
2	Select and use Files 02.02	Select and use cutting tools, cutoffs, diamond, backsaws 02.03	Select and use screwdrivers, wrenches, torque wrenches 02.04	Select and use taps, dies, drills, reamers 02.05	Select and use pilers and tweezers 02.06	Select and use fasteners 02.07		SELECT, USE AND MAINTAIN HAND TOOLS 02
3	Select and use soft and hard soldering equipment 02.09	Select and use power-hand tools 02.10	Select and use polishing stone, compounds 02.11	Apply lapping techniques 02.12	Apply heat treatment tech. to metals, tempering, hard, annealing 02.13	Select, use and make special tools and parts 02.14		
4	Select and use collimaters, centring devices, tool maker's microscope 03.08	Use temperature and pressure gauges 03.09	Select and use electrical meters, voltmeter, ohmmeter, ammeter, multimeter 03.10	Select and use chart recorders 03.11	Select and use oscilloscopes, signal generators, pulse generator 03.12	Select and use dielectric strength meters, insulation resist. testers 03.13		USE MEASURING EQUIPMENT MECHANICAL OPTICAL ELECTRICAL 03
5		Interpret current standards and code 04.04	Research technical data required 04.05	Draw simple sketches using drafting principle 04.06	Estimate time and materials for design and advantages of design 04.07			DESIGN ASSEMBLY AND TESTING DEVICES 04
6	Check sub-assemblies against special codes, e.g Fed. CSA Military 05.05	Test function and or accuracy of sub-assemblies 05.06	Isolate faults 05.07	Apply appropriate finishing techniques 05.08	Do final check to verify instrument function 05.09	Inspect final product for consumer acceptability 05.01		ASSEMBLE INSTRUMENTS MECHANICAL OPTICAL ELECTRICAL 05
7	Use appropriate lubricants 06.06	Calibrate and test mechanical, optical, electrical instruments 06.07	Maintain Calibration Chart 06.08	Order spare parts to maintain stock 06.09	Follow a maintenance program 06.10	Recommend changes in maintenance according to conditions 06.11		REPAIR, ADJUST AND MAINTAIN INSTRUMENTS 06
8		Read wiring diagrams 07.04	Read electrical and electronic schematics 07.05					READ AND INTERPRET BLUE-PRINTS AND SCHEMATICS 07
9	Identify and select plastics, rubber, insulating material 08.02	Select and use Adhesives 08.03	Select and use lubricants 08.04	Identify, select and apply material coatings, paint, power, annodizing 08.05	Identify electronic components 08.06	Identify and select electrical components and wire 08.07		IDENTIFY AND SELECT MATERIALS AND COMPONENTS 08
10	Write technical reports and service records 09.03	File and classify technical data 09.04	Use microfilm systems 09.05		Instruct technicians, operators, users in use of equip. 09.06	Practice human relations skills and business ethnics 09.07		COMMUNICATE EFFECTIVELY 09