CHAPTER I

A COMPUTER - AIDED PEER RATING MODEL USING THE DELPHI TECHNIQUE

A. INTRODUCTION TO DELPHI TECHNIQUE:

DELPHI is the name of a small island in Greece. According to Greek mythology there lived an old oracle who used to predict the future and help form policies for the Greek emperors. "Project DELPHI" is the name for a study of the use of expert opinion that has been intermittently conducted at The RAND Corporation. The technique employed is called the DELPHI method. Its object is to obtain the most reliable consensus of opinion of a group of experts. It attempts to achieve this by a series of intensive questionnaires interspersed with controlled opinion feedback.

The original experiment by Norman Dalkey and Olaf Helmer was designed to apply expert opinion to the selection, from the viewpoint of a Soviet strategic planner, of an optimal U. S. industrial target system and to the estimation of the number of Atomic bombs required to reduce the munitions output by a prescribed amount. Since then the DELPHI technique was widely applied to many management areas and further refinements were made. Today the literature divides the DELPHI Technique into two areas:

1) Forecasting DELPHI

2) Policy DELPHI

although the basic methodology remains the same.
The technique employed involves the repeated individual questioning of the experts (by interview or questionnaire) and avoids direct confrontation of the experts with one another.

The questions, which are all centred around some central problem, are designed to bring out the respondent's reasoning that went into his reply to the primary question, the factors he considers relevant to the problem, his own estimate of these factors, and information as to the kind of data that he feels would enable him to arrive at a better appraisal of these factors and, thereby, at a more confident answer to the primary question. The information fed to the experts between rounds of questioning is generally of two kinds:

It consists either of available data previously requested by some one of the experts or of factors and considerations suggested as potentially relevant by one or another respondent.

This mode of controlled interaction among the respondents represents a deliberate attempt to avoid the disadvantages associated with more conventional uses of experts, such as round-table discussions or other milder forms of confrontation with opposing views. The method employed in the experiment appears to be more conducive to independent thought on the part of the experts and to aid them in the gradual formation of a considered opinion. Direct confrontation, on the other hand, all too often induces the hasty formulation of preconceived notions, an inclination to close one's mind to novel ideas, a tendency to defend a stand once taken or, al-
ternatively and sometimes alternately, a predisposition to be swayed by persuasively stated opinions of others.

By systematically exploring the factors which influence the judgement of the individual expert, it becomes possible to correct any misconceptions that he may have harboured regarding empirical factors or theoretical assumptions underlying those factors, and to draw his attention to other factors which he may have overlooked in his first analysis of the situation. Needless to say, considerable discretion has to be exercised by the experimenters in any efforts designed to make an expert change his mind, in order to obtain results which are free of any bias on the experimenters' part. A device for helping to assure this is to feed in only such data as have been asked for by at least one respondent and are obtainable from reliable sources, and to suggest only such theoretical assumptions as seem to represent a consensus of a majority of respondents.

If the purpose of the experiment is the estimation of a numerical quantity, it may be expected that, even if the views expressed initially are widely divergent, the individual estimates will show a tendency to converge as the experiment continues. This is almost inevitable in view of the progressively more penetrating analysis of the problem, achieved partly by means of the procedural feedback described above.

SUMMARY:

In short, the advantages of DELPHI are:
1) avoids confrontation with opposing views
2) more conducive to independent thought on the part of the experts
3) aids them in the gradual formation of a considered opinion
4) "band wagon effect" is eliminated - the expert does not go with the crowd
5) "halo effect" is eliminated - a strong or famous personality does not sway the individual's opinion
6) achieves consensus against compromise, therefore results are better acceptable

The disadvantages of direct confrontation are:

1) induces the hasty formulation of preconceived notions
2) an inclination to close one's mind to novel ideas
3) a tendency to defend a stand once taken
4) alternatively and sometimes alternately, a predisposition to be swayed by persuasively stated opinions of others

In Delphi, even if the views expressed initially are widely divergent the individual estimates will show a tendency to converge as the experiment continues.
1. INTRODUCTION TO THE PEER RATING MODEL:

THE NEED FOR A SOCIAL ACCEPTANCE INDEX:

The adjustment of the adolescent to the Peer group depends to a large extent upon his ability to perceive his own status in the group as well as the status of the different members of the group.

Self evaluation and social comparison with Peers are normal characteristics of the adolescent period. (Debra and Lynn, 1982)². These are fundamentals of self-concept. The adolescent evaluates himself both physically and psychologically in relationship with age-mates by comparing himself with their standards of behaviour and also in terms of others¹, especially his Peer's attitudes towards him. From this appraisal he builds either a favourable or unfavourable self-concept. Yet self evaluation being subjective induction it is liable to result in a wrong concept of oneself. The "Social Acceptance Index" will indicate how one rates with his peers and his relative status in the group.

David C. Lundgren (1978)³, and David D. C. and M. R. Schwab (1977)⁴ assumed that discrepancies between individual's evaluation of themselves (self-esteem, SE), their perception's of others' evaluation of them (subjective public esteem, SPE), and others' actual evaluations of them (objective public esteem, OPE) are likely to constitute an important source of interpersonal stress or tension for the individual. They have accumulated considerable evidence in support of this hypothesis.
This stress situation is more dominant in peer relationship and in small group interaction. Margaret Mead's (1934) social self hypothesis too implied that effective social participation requires the ability to accurately assess and take into account the reactions of significant others.

In removing the discrepancy of assessment, the Social Acceptance Index that involves OPE will considerably help in the disjunction in interpersonal relationship.

The adolescent who craves the acceptance of his associates, when he knows the acceptance score received by him is towards higher level he is likely to be more extroverted, poised and self confident. This in turn increases the favourable concept he has of himself. As a result these personality traits will affect his level of social adjustment. Inversely, social acceptability is closely associated with adjustment. Whereas when acceptance score is poor or he is poorly accepted by the group he will show a degree of tension hampering his capacity of adjustment. Gaswick and others (1981) have shown that loneliness is related more to negative self-concept and low adjustment.

It appears that the course of his social development will be strongly influenced by his position within the peer group structure. He, therefore, must have the ability to perceive how he rates in with the group as well as the status of the different members of the group. SAI will indicate the relative status of each individual in a group. So that these students can improve their acceptance score.
It is still an encouraging sign as Eissert and Kahle (1982)7 have pointed out that the adolescent has the yearning to transform dissatisfactory features of the self. Those who were unacceptable to their peers may have had little opportunity to learn the required social values and behaviour patterns of their peers, or they had lack of knowledge of socially accepted forms of behaviour. The model helps the adolescents to perceive and evaluate himself in part as an object. Once one's own acceptance score is learned, it is significantly related to his further adjustment.

Much of the unhappiness the adolescent experiences could be eliminated or reduced to a minimum if he had healthier and more realistic concepts of himself.

Hence, the model to a huge part is an objective test of social acceptance and is likely to have many favourable points.

1) It will not suffer from subjective inference.
2) It gives evidence of their validity - how much each student deviates either way from the mean score towards sociability and unsociability. It gives relation of the self to the group.
3) It gives an index of the discrepancy between the two measures; the SE/EQ ratio (i.e. self-evaluation/evaluation by others).
4) The test did not blur the specific variations in each trait. The students knew how he rated in each of the traits i.e. the essential features of individual
difference is not blurred by the statistical, cross-sectional treatment of data.

5) The constellation of interrelationship of traits of different degrees in each student could be found.

6) The convenience of rating was owing to the students' constant association and these students knew each other at least for the past few years.

The question remains whether various volitions (wanting, deciding, initiation of action, etc.) would remain much the same as when he was ignorant of others' feelings towards him.
DEVELOPMENT OF THE PEER RATING MODEL:

INTRODUCTION TO THE PEER RATING MODEL:

An endeavour is made in this thesis to develop a kind of rating model which can be effectively used to find out a sociability index for an adolescent within his peer group. This index becomes an indirect measurement of how well-adjusted he is to his peer group.

Such a model seem to have great applicability in schools as evidenced in the school where the model was structured. Counselling is made easier and through discussions either in the classroom or individually. Every adolescent can be benefited. Two important points are brought out by such a model:

1) What the peer group "thinks" of the individual.
2) What the individual "thinks" of himself.

The following cases may arise:

1) Both group index and individual index are nearly same but on the Low side.
2) Both group index and individual index are nearly same but on the HIGH side.
3) Group index is HIGH, individual index is Low
4) Group index is Low, individual index is HIGH and counselling will definitely vary from case to case.

Another advantage of the rating model is that it reduces the subjective element in studying adolescent behaviour vis-a-vis peer determinants in evaluations and makes an attempt at quantification.
However, it must be clearly mentioned here that whatever single index such a model generates for an adolescent, it MUST BE TEMPERED with experience and judgement of a current situation prevalent if any counselling action is to be taken.

**THE MODEL:**

Two vital questions immediately arise when such an overall rating model needs to be formulated:

1) What factors to be rated?
2) How much weightage is to be given to these factors?

In our context, the literature survey had little to say on how scientifically such factors were selected for study. It is a feeling of the author that the researchers selected factors as per their own choice or interest. Arising from such feeling are questions like:

1) Shouldn't the peer group itself select the factors important to it?
2) Will all factors carry equal importance to the group?
3) How can we scientifically go about selecting those factors and allocating weightage of importance?

These questions led naturally to the choice of the Delphi technique where the peer group itself became the "panel of experts."
THE FRAME WORK:

The model requires a number of factors to be identified by the group for evaluating their sociability and attach important weights.

EXAMPLE:

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>50</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
</tr>
</tbody>
</table>

Next, each adolescent member of the group is rated against factors A, B, C on a scale suitably chosen. This scale may be a 3-point, a 5-point or a 10-point scale. Assume a 3-point scale where 1 stands for low, 2 average and 3 high, for a while. Suppose Adolescent X gets a sum score of 25 from his peers on factor A, 30 in factor B and 10 in factor C.

Then for Adolescent X the sociability index is calculated as:

\[
\text{SOCIAL INDEX} = \frac{\text{Weight of Factor A} \times \text{Score on Factor A}}{(N-1)} + \frac{\text{Weight of Factor B} \times \text{Score on Factor B}}{(N-1)} + \frac{\text{Weight of Factor C} \times \text{Score on Factor C}}{(N-1)}
\]

\[
= \left( 20 \times 25 + 50 \times 30 \times 10 \right)/(N-1)
\]

\[
= \left( 500 + 1500 + 300 \right) = 2300/(N-1) \text{ where N is the no. of observers.}
\]

\[
\text{SOCIAL INDEX} = \frac{\text{Sum of weighted scores}}{\left( \text{Sum of weights} \right) \times \text{number of students evaluating}}.
\]
The rating model above is simple and deliberately kept simple for quick and effective administration. The scale which was chosen by the author was a 3-point scale in the hope that the respondents will not tire as fast as they would in deciding in a 10-point scale. But the problem that arose with the sample group was that the final scores were very close to one another. Due to obvious constraints the experiment could not be repeated and so each individual score (1, 2 or 3) was squared (1, 4, 9) and then added up and normalised. This second best resort did bring out marked differences for the author to select the prize for "most socially acceptable" student. A 10-point scale ought to have been a better choice instead of this artificial (mathematical) exaggeration of differences without affecting the basic framework of this rating model. The computer programs involved in capturing the data and then analysing them in the light of this Rating Model are enclosed.

The sample group consisted of 48 adolescents who selected

1) COURAGE
2) DISCIPLINED MIND
3) HELPFUL
4) INTELLIGENCE
5) ORDERLY

as factors most important to them. In addition, the author added SOCIABLE as the sixth factor for an overall estimation of these
five factors which were primarily selected as contributory to sociability of a peer member.

Thus each respondent was called upon to rate $48 \times 6 = 288$ factors (included his own evaluation) on a 3-point scale.

Such a questionnaire (as enclosed) could have been very tedious. In order to liven up the answering session the author hired a Personal Computer, DCM Tandy TRS 80 Model 4, and a program was written which displayed automatically all the names of the members, one by one, and the factors. The respondents found this way of responding to a computer questionnaire very interesting.

The other advantage was that the data was captured "on-line" and thus eliminated data entry, checklisting and amendments. The data file created was taken as input to the Rating Model program directly.

As far as the author is aware no one else had used a computerised questionnaire in this field of study. The use of the Delphi Technique in Peer Evaluation studies is also original as well as the Expected Value Rating Model.

**EXPECTED VALUE MODEL:**

This is a deterministic model as it stands where the peer group evaluates the member for sociability and scores are multiplied by weights. The model can be extended into a probabilistic expected value model.
Suppose Adolescent X is subjectively evaluated to have the following probable points, by a counsellor after talking to a few members of the peer group.

<table>
<thead>
<tr>
<th>WEIGHTS</th>
<th>FACTORS</th>
<th>PROBABILITY OF SOCIAL ACCEPTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>A</td>
<td>.50</td>
</tr>
<tr>
<td>50</td>
<td>B</td>
<td>.60</td>
</tr>
<tr>
<td>30</td>
<td>C</td>
<td>.90</td>
</tr>
</tbody>
</table>

Then,

\[ \text{Expected value of Index} = 20 \times 0.50 + 50 \times 0.60 + 30 \times 0.90 \]

\[ = 10.0 + 30.0 + 27.0 \]

\[ = 67.0 \]

It may also be possible now to determine a threshold score below which the member is "rejected" as socially unacceptable by a particular group.

Such an expected value model will be of great use to the class teacher or counsellor in situations where the entire class cannot be called upon to evaluate a member/new member.

The justification of an expected value model is simply that instead of evaluating a member purely on subjective, intuitive feelings a teacher now deliberates on quantification of these "feelings" and this ought to lead to a better decision making process.
The model is also amenable to easy computerisation which is essential and relevant in India considering the ratio of counsellor to students ratio.

The following pages describe in detail each questionnaire and how they were administered, followed by discussions of the results.