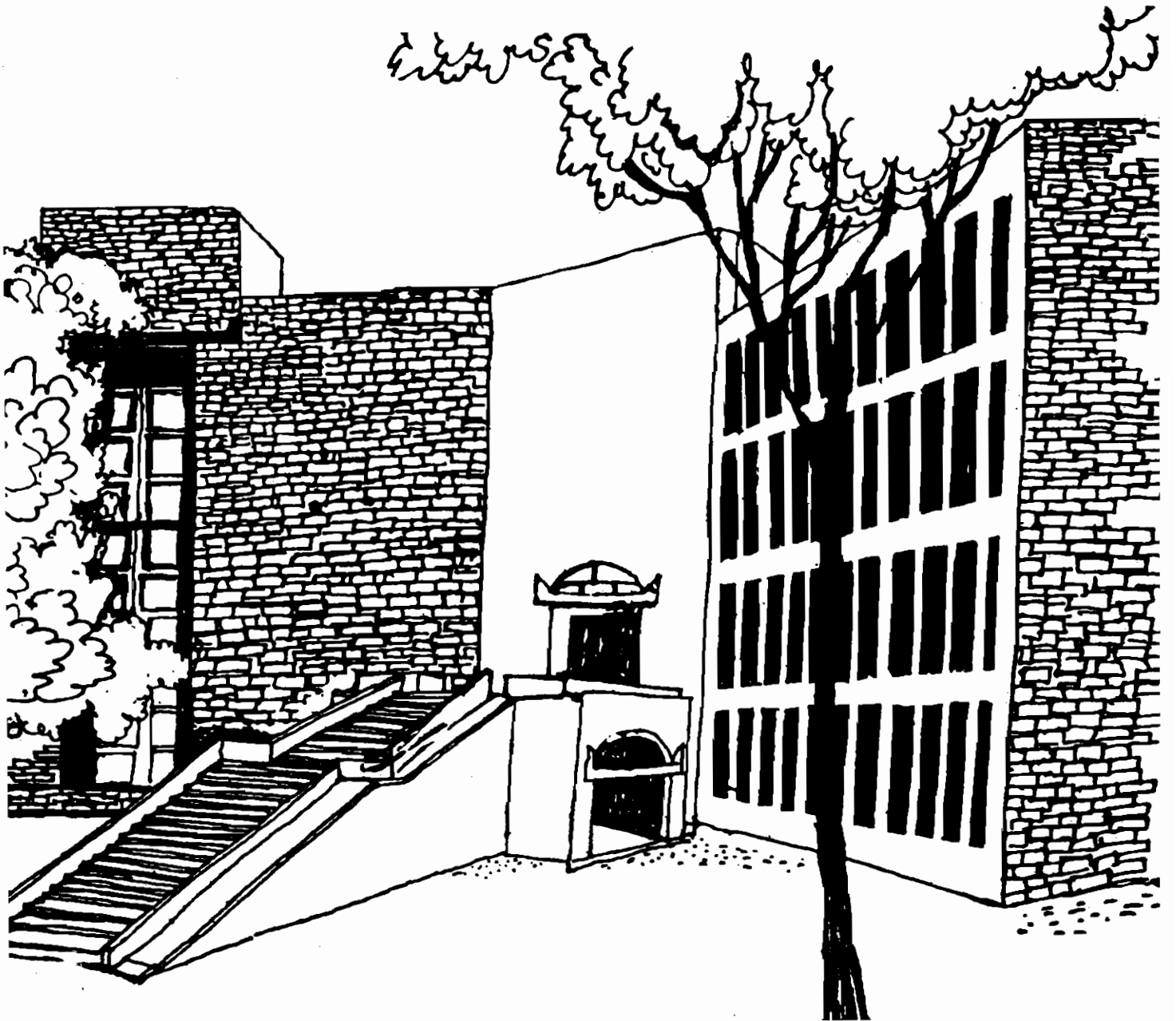




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# Working Paper



**A TEST FOR STRATEGIC PLANNING RELATED  
TO MANAGEMENT**

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A TEST FOR STRATEGIC PLANNING RELATED TO MANAGEMENT

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## A TEST FOR STRATEGIC PLANNING RELATED TO MANAGEMENT

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The evidence in favour of predicting managerial success from intelligence tests is mixed. It is difficult to support the predictability of intelligence tests for occupational success (Thornton & Byham, 1982). After reviewing the evidence, Thornton & Byham reluctantly recommend the use of intelligence tests only for the selection of first-level supervisors (p. 158). McClelland (1973) even goes further in questioning the use of intelligence tests. In his widely noted article, McClelland begins with provocative remarks, such as, we blindly promote "the use of tests as instruments of power over the lives of many Americans" (P.1). Drawing upon an array of studies, McClelland concludes that education or school grades are unrelated to vocational success in a wide variety of jobs. Even for highly intellectual jobs such as academic research, college grades have little predictability. This latter statement has relevance to MBA education where entry to the programme is mainly determined by one or another kind of aptitude and intelligence test. In place of such tests, he recommends that generalized competencies should be delineated by focusing directly on the thought patterns which are required for the manager's roles. We propose a test for assessment of managerial ability. The test or task requires a

management decision for maximizing profit under certain realistic constraints, and can be regarded as a test of generic competence in planning and decision-making.

#### **A test of strategic planning**

Suppose in a pharmaceutical company you are the Chief Executive Officer. The company can have the following overall strategies in order to prosper: (a) be innovative, (b) achieve a good share of the market, (c) be known for its economical price-low cost of products (d) produce high quality goods.

**Cautionary notes for each strategy:** (a) Requires an outlay of capital in research and development. But the world record shows that in the last five years, research and development money has increased five fold, but the number of new products launched has remained the same. (b) Requires aggressive advertisement, but the company's star product (i.e., Bayer Aspirin) is about to be replaced by a new break-through medication for fever. (c) Requires getting the components of the products, from manufacturing to packaging, from developing countries where labour is cheap. But this has a disastrous effect on employment at home. (d) The product of high quality may cost so much more as to make it uneconomical.

In the 30 year past history of the company, the following weights had been given to the strategies with results indicated. Your job is to achieve a 100% growth by rearranging the strategies; but you must take into account the information from the past results:

A past manager gave 1st place to C, 2nd place to D, 3rd place to A, and 4th place to B. None of CDAB are in the correct position. The profit dropped to 0% because not even one of the strategies were in the correct place. Choice of C in the first place, D next, A and then B in order of importance, resulted in zero profit. None of the choices were in the right place. This is expressed as CDAB=zero.

Another manager gave 1st place to D, 2nd place to A, 3rd place to B, and 4th place to C. Two of DABC are in the correct position. The profit was 50%, because only two of the strategies were in the correct place. You do not know which two. DABC=2.

Another manager gave 1st place to B, 2nd place to C, 3rd place to D, and 4th place to A. Of these, Two choices were in the correct place. Again we do not know which ones were these. The profit was also 50% because like the previous choice, only two of the strategies were in the correct place. BCDA=2

Assign the priorities so that the right strategy will have the right place to give a 100% profit.

? ? ? ?=4.

There are two correct solutions (DCBA and BADC); all MBA students should be able to find these. In the next phase of the strategy-game, students are asked to write an essay in about one page justifying how the plan produced the best results when the solution is DCBA (or BADC).

Rating the answers: it's described later in the results section.

This strategy planning test is a modified version of "Crack the Code", a test of Planning that has been used before and has been shown to load on a "Planning" factor in previous studies (see Das, 1984; Naglierj & Das, 1987, 1988).

In this test, as in Strategic Planning Test, the student's task is to determine the correct sequence of a number of colored chips when given a limited amount of information. The pharmaceutical company problem is a replica of the Crack-the Code problem, as will be apparent from the following example.

Four different colored chips, Blue, White, Yellow, and Red are used in this example. The colors are arranged in rows; against each row is the feedback, that is, number of chips correctly placed (zero, 2,2). These are given so that the subject can use them to get the correct answer.

A person was trying to crack the code, and guess what the correct solution will be. He guessed that Yellow Red Blue White should be the correct placements of the colors. Nothing was right.

Then he guessed.

Red Blue White Yellow to be the correct placements. Only two were right, but he did not know which two.

Then he guessed White Blue Red Yellow. Again two were right, he did not know which two.

What do You think should be the placements to get all four right?

The major purpose of the present study is to determine the psychometric properties of the Strategic Planning Test so that it can be used as a measure of managerial planning. A minor purpose



is to check its relationship to the academic performance of the management students who have taken the test. We do not expect a strong relationship because courses test knowledge-base acquired through class lectures and reading text books, whereas the test does not.

#### METHOD

Subjects were first year students of the two-year MBA Programme at the Indian Institute of Management, Ahmedabad. The experimenter through a circular note requested the students for voluntary participation in a study of "management problem solving". The date, time, venue, and the duration (approximately 30 minutes) of the experiment were also announced. Subjects in groups 50-60 assembled in large classrooms. The Strategic Planning Test which was self explanatory was administered to the students by three different experimenters (two research associates and Misra) in three different classrooms. A total of 157 students between 20-24 years of age participated in the experiment. Upon completion of the experiment and the essay writing justifying how the plan (solution DCBA or BADC, whichever applicable) produced best results, each student was requested to give written consent permitting the experimenter access to his/her grades in various courses of the program and their use for research purposes. Each student was assured of anonymity and confidentiality with respect to this information.

#### TESTS:

The Strategic Planning Test has been described above. The

Course performance grades were collected for all students; the final grade point average which was used for this study was an average of the student's performance on 23 courses.

## RESULTS

Three independent judges were asked to rate the essays of all the subjects on a 7 point scale, '1' representing very superior and '7' representing very poor for each of the 10 items (see Table 1). The judges were graduate students with 5 or 6 years of university education and had previous experience in doing similar type of ratings.

The judges were provided with the 10 item rating scale and the essays of all the 157 subjects. Before scoring the whole pile of essays, they were required to score 5 essays and check with the coordinator to ensure that the rating scale and the scoring procedures were understood properly. The judges rated the subjects independently and marked the essays, that were photocopied from the original essays, for arriving at a score on each item. They were allowed to underline, circle, or provide comments on each essay, so that they may be able to recheck a particular score for a subject on a certain item.

Chronbach's alpha reliabilities, representing internal consistency in the ratings, for each judge were .87, .88, and .97, respectively. However, the intercorrelations among the judges were .49, .52, and .51, respectively. A mean intercorrelation of .51 may be somewhat low, but not bad considering the independent scoring procedure followed in this study. In future studies a number of steps can be followed to increase agreement

among the judges. They are as follows: 1) compare the first five or ten protocols of each judge in a group meeting to arrive at a consensus on the item score and, 2) If a discrepancy of more than two points occurs between two judges on any item for a subject, give the protocol for rescoring by the same judges without letting them know the location of discrepancy.

The scores of the three judges were combined to arrive at one score for each item. Thus each subject had 10 scores for the 10 items of the Strategic Planning Scale. A Principal Component analysis was performed on the 10 items to examine their factor structure. The result of an orthogonal solution with Varimax Rotation is presented in Table 2. Items 3,4, and 10 with factor loading of .73,.91, and .82 respectively, constituted the second factor. All the other items had factor loadings of .64 and more on the first factor. Based on the results of this factor analysis, comments of the judges, and an examination of the contents of these items, items 5,6,7, and 8 were combined (averaged) to get a composite score and items 1 and 2 were combined (averaged) to form another score. Items 5,6,7 and 8 were judged to be related to logic and meaningfulness of sentences and paragraphs, and items 1, and 2 were related to the issue of the selection of strategies or solutions (DCBA or BACD) for the essay. Thus the 10 items scores were reduced to 6 scores by these combinations.

A second factor analysis was, therefore, performed with the six item scores and the factor loadings for the varimax rotations are presented in Table 3. As expected items 3,4, and 10 remained invariant and continued to have high loadings of .62, .92 and .82

respectively, on the second factor. All other items had substantial loadings on the first factor, as before.

In naming the first factor, we can identify it by the items that measure internal organization; that is, internal or dependent on the writing of the essay itself. In contrast, the second factor is identified as external organization, the source being outside and beyond the content of the essay. The two kinds of organizations, internal and external can also be named as horizontal and lateral, borrowing the terms from deBono (19??).

The next step of the analyses involved comparing the correlations of the items of the Strategic Planning Test with the grade point average of the subjects (see Table 4). Items 4, 5, and 10 had significant but very small correlations with the grade point average : these were .13 ( $p < .05$ ), .22 ( $p < .01$ ), .17 ( $p < .05$ ), and .14 ( $p < .05$ ) respectively. The mean of the items representing internal organization (items 1+2, 5+6+7+8, and 9) and the mean of the items representing external organization (items, 3,4 and 10) had small but significant correlations of .15 ( $p < .05$ ) and .14 ( $p < .05$ ) with grade point average respectively. These correlation coefficients indicate that for all practical purposes, individual differences in strategic planning may be independent of grade point average for this sample of students who were highly selected in terms of general ability.

**Scoring procedure for the future users:** Based on the procedure and results obtained in this study, future users of the scale may like to retain the 10 items reported in Table 1, but to obtain the 6 scores, take the average of items 1 and 2, and the

average of items 5,6,7 and 8 to compute two new scores. Thus the average of these two new scores and item 9 will provide the 'factor' score for internal organization while the average of items, 3,4 and 10 will provide the score for external organization for each subject.

#### DISCUSSION

The results show that we have a fairly reliable instrument for measuring essay-type protocols, ready to be used for validation studies. We recommend that one essay should be written for the solution DABC, and subsequently, for BCDA. Flexibility in changing the justifications from the first to the second essay can thus be measured on a 7-point scale: Extremely flexible, justifications were quite appropriate and convincing (7) through Justifications were convincing, but not as good as the first one (4) to Rigid, could not come up with convincing justifications at all (1). We also recommend that some generic tests of planning such as harder forms of Crack-the-Code should be given. Those who do well in both in the Crack-the-Code type tests and the Strategic Planning Test should be judged as potentially excellent managers, all other conditions remaining constant.

Some validation studies for the prediction of excellence in management are suggested. Suppose we select the top 25% and the bottom 25% of the students on the basis of the essays (and on other generic tests such as Crack-the-Code). One of the validation studies may consist of following these students after graduation into their performance on managerial jobs. Then it

will be possible to rate their performance on the job and check if the tops are rated as better managers, in fact excellent ones, compared to the bottom 25% in their first two years of service. Within the first two years, we do not expect them to be so very entrenched in the specific environment of the company that their decision-making would have been 'welded' to the idiosyncratic conditions of the job. The ratings are to be in comparable jobs and companies however.

Some initial suggestions in regard to comparability are (1) the size of the organization and the number of subordinates of the manager, (2) type of organization (Government and Non-government), and (3) the type of management job (Sales, Staffing and Administration, Production).

Another validation study may be suggested as well. Let us start with a large organization where there are several management positions, and then get the incumbents rated on their competency/efficiency. All managers must be also new, within their first two years. Then take the top and bottom 25% and administer to them the Strategic Planning Test (as well as other generic tests of planning). If the tests clearly distinguish between these two groups of managers, then they will be valid.

The difficult question is, of course, rating managers in their companies. What are the criteria for rating them as good decision-makers? Who should be rating them? An instrument for rating managerial excellence in companies may have to be constructed. Basing such an instrument on the guidelines provided by Klemp and McClelland (1986) as to the cognitive activities required of the managers or on the characteristics of

the 'vigilant manager' as so aptly discussed by Janis (1989, p91) is recommended. Following Janis, for example, a questionnaire comprising the main steps of a 'vigilant' decision-maker who is engaged in solving a novel as well as a complex problem can be constructed. This will include the 4 steps of the procedure for problem-solving, which are: Formulating the problem, Using informational resources, Analyzing and reformulating the problem, followed by Evaluation and selection of the solution. The downside, or the defects typically noticed in the manager's problem-solving should also be a part of the questionnaire. Examples are: Gross omissions in surveying objectives and alternatives are noticed, and failure to reconsider originally rejected alternatives. The validation studies, therefore, will depend on the criteria for judging managerial excellence. We do expect that the Strategic Planning test and the tests of generic planning, together, will predict the excellence in managerial decision-making when motivational and affective components do not overwhelm the decision-making process.

Table 1

**Strategic Planning Rating Scale**

1. Have all the strategic choices been mentioned in the essay?

1	2	3	4	5	6	7
Mentions all 4 strategies clearly		Mentions 2 to 3 strategies clearly			Does not mention any of the strategies	

2. Has justification been given for the relative positions of the strategies?

1	2	3	4	5	6	7
Justification for all 4 strategies provided clearly		Justification for 2 to 3 strategies provided clearly			Does not provide justification for the relative positions of the strategies.	

3. Have the cautionary notes been used directly or indirectly?

1	2	3	4	5	6	7
All four cautionary notes are used directly or indirectly		Two or three cautionary notes are used directly or indirectly			None of the cautionary notes are used directly or indirectly	

4. Is there evidence of external knowledge?

1	2	3	4	5	6	7
Extensive use of information not included in the description provided for the task.		Some utilization of information not included in the description provided for the task			No utilization of information in the description provided for the task.	

5. Have conjunctives[qualifiers (even, although etc.), conditionals (if, since, except etc.) and causalities (because, so, therefore, hence etc.)] been used appropriately?

1	2	3	4	5	6	7
All conjunctives are used in a logical and meaningful manner.		Some confusion in the use of conjunctives.			Most conjunctives are used inappropriately.	



6. Do sentences follow one another logically and meaningfully?

1	2	3	4	5	6	7
All sentences flow logically and meaningfully.		Some sentences do not flow logically or meaningfully.			Many sentences do not flow logically or meaningfully.	

7. Do paragraphs have distinct themes?

1	2	3	4	5	6	7
Specific themes are clearly expressed in each paragraph.		Some paragraphs have unclear/overlapping/disjointed themes.			Most paragraphs have unclear/overlapping/disjointed themes.	

8. Do paragraphs follow one another logically and meaningfully?

1	2	3	4	5	6	7
All paragraphs flow logically and meaningfully from one another with necessary transitional statements.		Some paragraphs do not flow logically and meaningfully from one another. Some deficiencies in making a transition.			Most paragraphs do not flow logically or meaningfully from one another. Inappropriate transitions.	

9. Is there a structure in the composition?

1	2	3	4	5	6	7
Good starting point, ideas are presented concisely, has a sense of direction in the composition leading to a definite conclusion.		Have an overall sense of direction. Some inconsistency and redundancy.			Lacks starting point. Never gets anywhere. Full of conflicting, inconsistent and irrelevant ideas.	

10. Is the composition unique/original?

1	2	3	4	5	6	7
Unique and creative approach to material; unusual or original ideas; gives the composition a "twist".		Some originality shown; few interesting or unique aspects			Not original at all: ideas are mundane, not creative and uninteresting.	

Table 2

Principal Components Orthogonal Solution-Varimax For the 10 Items of the Strategic Planning Test

Items	Factor I	Factor II	<sup>2</sup> h
Item 1	.76	.31	.67
Item 2	.64	.56	.72
Item 3	.45	.73	.74
Item 4	.24	.91	.89
Item 5	.73	.24	.59
Item 6	.84	.32	.81
Item 7	.79	.37	.77
Item 8	.79	.40	.78
Item 9	.75	.50	.82
Item 10	.43	.82	.86
Percentage Variance	68.3	8.2	

<sup>2</sup>  
h = communality estimate

Table 3

Principal Components Orthogonal Solution-Varimax for 6 Derived Items of the Strategic Planning Test

Items	Factor I	Factor II	$h^2$
Mean of Items 1 & 2	.86	.33	.85
Item 3	.55	.62	.69
Item 4	.27	.93	.93
Mean of Items 5,6,7,8	.82	.36	.80
Item 9	.86	.37	.88
Item 10	.46	.82	.88
Percentage Variance	73.5	10.5	

$h^2$   
 $h^2$  = communality estimate

Table 4

Correlation Coefficients of Grade Point Average and Strategic Planning Test

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Variables	Grade
Item 1	.0493
Item 2	.0706
Item 3	.0943
Item 4	.1340*
Item 5	.2175**
Item 6	.1747*
Item 7	.1168
Item 8	.1210
Item 9	.0700
Item 10	.1442*
Vertical Organization	.1486*
Horizontal Organization	.1366*

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\* p < .05

\*\* p < .01

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