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Decisions made in the face of uncertainty pervade the life of every individual and organization. Even animals might be said continually to make decisions, and the psychological mechanisms by which men decide may have much in common with those by which animals do so. But formal reasoning and suitable methodological procedures presumably play no role in the decisions of animals, little in those of children, and less than might be wished in those of adult men and women. The purpose of this paper is to introduce a new technique, called Judgment Analysis, which is making headway in educational circles and shows great promise for educators who are faced with decision-making responsibilities. Judgment Analysis lends itself to decisions which are individually made or collectively determined.

Judgment Analysis

The Judgment Analysis process (JAN) is an adaptation of methods developed by Ward (1961) and by Bottenberg and Christal (1968) which combines the multiple regression approach with a hierarchical grouping technique. To illustrate the process, consider a situation in which a judge is presented with a number of applicants for a job. The first step in applying the JAN technique in this hypothetical situation would be to secure a complete job classification breakdown. This breakdown should include all variables considered relevant, e.g., amount of education required, special abilities, interpersonal skills, experience, etc. (Where actual data are not easily obtainable, Naylor and Wherry (1965) discuss procedures whereby job profiles may be simulated.) Instead of following the usual procedure of asking each judge to determine the relative importance of each of the profile items so

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that a proper weighting of the variables can be obtained in forming a selection battery, each judge is asked to examine the profile for each applicant and give him an overall score that will serve to rank the applicants in an order of merit. The assigned score for each applicant is then utilized as a projected criterion score with the profile items serving as the independent variables. At this point a series of zero-order validity coefficients are determined which relate each individual predictor to the criterion and which in turn are used in obtaining a multiple regression equation for that judge. Geometrically, the weights obtained in this equation determine the hyperplane which represents a policy statement for that judge and the resulting R^2 (the magnitude of the obtained squared multiple correlation coefficient) is an indicator of the intrarater consistency of his judgments. With this approach it becomes possible to present a number of judges with the same set of stimuli and consequently obtain a policy equation for each judge. The results of this stage alone provide the investigator with some indication of each judge's policy-making ability and unacceptable raters may be eliminated by comparing the R^2 computed from their equations with the R^2s obtained for the other judges in the sample.

Using the results from stage one, a hierarchical grouping procedure is initiated. This procedure allows the investigator to group individuals on the similarity of their prediction equations. Christal (1968) discusses the criterion-grouping techniques in some detail. A single value of R^2 is computed to indicate the overall predictive efficiency obtained when a separate least-squares-weighted regression equation is used for each judge. The two judges who have the most homogeneous regression equations are then located and the computer prints the single equation that best represents the joint policy of these two judges as well as the loss in overall predictive efficiency that results when the N original equations are reduced to N-1 equations. The process continues systematically to reduce the number of judges by one at each step until all judges have been grouped into a single

cluster. At each step of the grouping an examination of the loss of predictive efficiency makes it possible to identify the different judgmental policies which exist.

The hierarchical clustering process will identify the minimum number of different judgmental policies which actually exist as well as the areas of agreement and disagreement. If the primary purpose for using the JAN technique is to determine a joint policy, then a special arbitration mechanism built into the JAN process is of great assistance. Once the judges have been informed of the minimum number of different policies as well as areas of agreement and disagreement they are asked to meet again and arbitrate the criterion decisions (the ranking of the job applicants). This will yield a single joint policy reflecting the collective thinking of the group. The technique of arbitration of the criterion rather than of the weightings applied to the predictor variables is one of the powerful aspects of JAN process.

Elementary Teacher Selection Policies

An example in which the JAN technique was applied is in the area of teacher-selection policy. The purpose of the study was to examine the teacher-selection policy of a suburban elementary school district and contrast it with the teacher-evaluation policy.

Two policy models were captured by utilizing the JAN technique. In the first model, called the ex ante model, the hiring policies of four school district personnel charged with teacher selection were captured on the basis of judgments given by each school official. Each official was presented with profile data on 52 teachers and then asked to rank them. The 32 profile variables consisted of information typically available when teachers are hired including: (1) biographical information; (2) interview data; (3) college preparation, (4) educational experiences; and (5) other experiences.

Results indicate that in the ex ante model, a policy was clearly stated by each of the judges as

approximately 90 percent of the variance was explained. The investigators used multiple linear regression, according to Ward (1962), to determine the unique contribution of proper subsets of the predictor variables to the prediction of the criterion rankings. The contribution of a set of variables to prediction may be measured by the difference between two squares of multiple correlation coefficients (R^2s), one obtained for a regression model in which all predictors are used, called the full model (FM), and the other obtained for a regression equation in which the proper subset of variables under consideration has been deleted; this model is called the restricted model, (RM). The difference between the two R^2s may be tested for statistical significance with the variance ratio test. The hypothesis tested states, in effect, that these variables contribute nothing to the determination of the expected criterion values that is not already available in the restricted prediction system. Using Ward's technique the investigators found that the most important subset of predictor variables in the ex ante model was interview data followed by other experiences, college preparation, educational experiences and biographical information in that order.

In the second model, called the ex post model, the performance policy of four administrators was captured via JAN techniques with the ranking evaluations of 78 teachers. Results indicate that policy existed in the ex post model, though not so clearly defined as approximately 55 percent of the variance was explained. College preparation was the principal source of predictor information in the ex post model, followed by other experiences, educational experiences, biographical information and interview data.

Conclusion

In summary, what has been presented in this paper is a new technique which seems to offer much hope and assistance to educators faced with decision-making situations. JAN seems promising as a tool for educators both as a vehicle for identifying what policy may presently exist as well as a mechanism for setting or determining appropriate new policy.

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