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ABSTRACT
        Issues in student placement, particularly of
economically disadvantaged gifted students, are addressed. After a
brief review of the legislative history of efforts to identify and
serve this population, the conceptual framework of two diverse
theoretical positions, decision theory and justice as fairness, is
examined. Decision theory is considered in terms of characteristics
of the psychometric models of fair selection. Justice as fairness is
contrasted with utilitarian values: a utilitarian framework equates
maximizing utility in the aggregate with achieving equity. Justice as
fairness theory does not equate the two, but emphasizes the effects
of placement decisions on such basic liberties as self respect.
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NO. 56   UTILITY AND EQUITY
IN STUDENT PLACEMENT

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2

No. 56   UTILITY AND EQUITY
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PREFACE

The Research on Evaluation Program is a Northwest Regional
Educational Laboratory project of research, development, testing,
and training designed to create new evaluation methodologies for
use in education. This document is one of a series of papers and
reports produced by program staff, visiting scholars, adjunct
scholars, and project collaborators--all members of a cooperative
network of colleagues working on the development of new
methodologies.

How should special children (gifted, disadvantaged, handicapped)
be assigned to educational programs? How does one assess the
utility and equity of various placement strategies? In this
paper, Steve Murray considers the nature of placement strategies
under the utilitarian assumptions of decision theory, which
treats utility and equity as identical and contrasts that view
with an alternative view where considerations of justice as
fairness leads to the position that utility and equity are not
synonymous. These analyses illustrate approaches to integrating
value considerations with technical considerations in insuring
the equitable placement of children in educational programs.

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Nick L. Smith, Editor
Paper and Report Series
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CONTENTS

UTILITY AND EQUITY IN STUDENT PLACEMENT

Introduction

Evaluators are frequently enlisted to assist program
personnel in developing strategies to select students for
alternative educational programs. Low achieving students, gifted
and talented students, low-income students and handicapped
students are among those who are expected to benefit from such
programs. Each program's selection strategy is based, in part,
on the requirements of a particular legislative act and its
supporting regulations. Independent policies governing selection
strategies for federal and state programs serving different
populations often lead to placement strategies that are a
haphazard collection of distinct selection strategies.

The problem is exacerbated by the role that evaluators are
generally expected to fill in developing selection strategies.
Evaluators are construed as test and measurement experts who will
help find the most suitable test and criterion for selecting
students (cf. Lyon, 1978). The evaluator, as a measurement
expert, is expected to judge instruments on the basis of their
validity and reliability, which are taken to be properties of
tests, a belief that further constrains the evaluator's role.
The evaluator's potential contribution, however, goes
considerably beyond that of the measurement expert. The
properties of sound selection and placement strategies depend on
the purposes to be forwarded by the programs available.

Selection and placement decisions are implicitly based on
consensual or negotiated institutional and individual values.
The value context must be taken into account in planning a sound

strategy. A good selection strategy should contribute to efficient, stable, and just institutions.

Recent years have evidenced increased emphasis on justice (equity) as a basic value to be sought in selecting students or placing them in educational programs. Particular conceptions of social justice have sometimes overridden conservative values of efficiency and stability. There are a number of illustrations of the concern for justice in selection and placement. Analysis of test bias in employment selection and academic selection reflect, in part, a concern for social justice. Fundamental concerns for justice are also expressed in the legislation for educational programs.

The basic topic addressed in this paper is the concept of justice as it impinges on the design of student placement strategies under compulsory education. To bring the ideas into a practical context, they will be discussed in relation to special programs for economically disadvantaged students. Particular emphasis is placed on selection of disadvantaged students for gifted and talented programs.

Equity Issues in Legislation

Since the mid 1960s federal and state incentives have encouraged educators to provide special educational services to children from low-income families. Title 1 of the Elementary and Secondary Education Act provides for supplementary educational services to low-achieving students from low-income families.[1] More recently, policy has provided for targeting services to the special education needs of students who are from low-income families and who have exceptional capabilities. The Gifted and Talented Children's Education Program was authorized under Section 404 of Public Law 93-380, The Special Projects Act. It was reauthorized by the Educational Amendments of 1978 (Public Law 95-561) as Title IX, Part A, of the Elementary and Secondary Education Act. Proposed regulations for the Department of Education's administration of the Act were published in the

8

Federal Register (June 25, 1979). The legislation and supporting regulations call on state and local education agencies to develop systematic procedures for identifying disadvantaged gifted and talented students from low-income families.

In 1977 forty-three states had specific policies guiding the education of gifted and talented students (Mitchell and Erickson, 1978). The policies of thirty states outlined requirements for identifying students. California's Gifted and Talented Program, for example, provides the policy basis for making gifted and talented programs accessible to a more diverse population of students than under the previously legislated Mentally Gifted Minor Program.

Broadly speaking, merging public concern for educating gifted and talented students with that for educating students from low-income families may be interpreted as a concern for justly distributing educational benefits. More specifically it assumes that traditional procedures fail to identify students from low-income families who stand to benefit from educational programs for gifted and talented students.

Toward a Conceptual Framework

Evaluators called upon to plan, develop, implement or appraise identification and selection procedures are obliged to deal with issues ranging from value conflicts to technical problems. Procedures implemented should achieve a reasonable balance in their approach to the issues involved. Creative solutions dealing with the constraints and meeting the requirements of a particular setting are necessary. Conceptual guidance may prove a useful starting point to evaluators. An ideal conceptual framework would suggest procedures which are self-correcting, that is, subject to checks of validity, acceptablity, and efficiency. This paper is a first step in explicating such a conceptual framework, drawing on two diverse theoretical positions, decision theory and the concept of justice-as-fairness (Rawls, 1971).

Decision Theory

Decision theory has been accessible to educational measurement and evaluation specialists since introduced by Cronbach and Gleser (1965) in 1957 and in revised form in 1965. Its theoretical form is well specified, and it has been applied to bias in selection, a problem closely related to fairness in identification and selection of students for gifted programs (cf. the Journal of Educational Measurement, Spring 1976).

The extent to which practice is congruent with theoretical prescriptions of decision theory is not well known. The concluding article in the special issue of the Journal of Educational Measurement, devoted to bias in selection, suggests that practice is influenced by more factors than have been captured by straightforward applications (Breland and Ironson, 1976).

Breland and Ironson (1976) analyzed data used in admissions to the University of Washington Law School in 1971. They found a far greater proportion of ethnic minority group members were admitted than would have been admitted by applying any of the competing psychometric models of selection fairness. The law school admitted 53% of the ethnic minority group members and 15% of the non-minority group members. At most, application of the psychometric selection models would have admitted 16% of the ethnic minorities with over 17% of the non-minorities being admitted.

While there were differences between the psychometric models (i.e. some models would have led to admitting more minority applicants than others), there was a much greater difference between the values inherent in the decision-making process of the committee and the psychometric models. In order to identify reasons for the discrepancy it will be helpful to examine the basic characteristics of the psychometric models of fair selection as these models can be generalized to the problem of fair placement. A selection process is characterized by the following elements:

4

1) Individuals (e.g. students) about whom selection
    decisions are to be made. That is, individuals who
    will be assigned to a select group

2) Information (about each individual) that is used in
    making the selection decision (regarding each
    individual)

3) A strategy by which the information is analyzed to
    reach a final selection decision (in the select
    group or not in the select group)

4) An outcome expressed as the individual's performance
    after assignment

5) Subpopulations for whom there is an _a priori_ belief
    that different selection strategies may be necessary
    or who by virtue of public concern must be singled
    out to ensure all individuals are being handled
    fairly.

In the simplest selection situation it is assumed that there
is only one possible "treatment". Individuals are either
accepted to or rejected from the institution. Acceptance is
determined on the basis of information (e.g. test scores) on each
individual prior to their entering the institution. The
objective is to accept those persons who will succeed and reject
those who would have failed.

The soundness of any selection strategy is predicated on the
availability of prior information regarding the relationship
between the predictor and the criterion in an unselected
sample. Analyses of the utility or the fairness of any
selection procedure in accord with the psychometric models
developed to date assume that an acceptable criterion is
available. That is, they assume that the criterion score used is
reliable, relevant, and an unbiased measure of the essential
outcomes of the program involved. Omitting important outcomes
will negate the soundness of the analyses.

A minimally acceptable level of performance on the criterion
is established. Those persons falling above this level are
designated successful and those below the level are designated
unsuccessful. Similarly, a cutoff score on the predictor variable
is established and applicants are accepted or rejected depending

5

on whether they fall above or below the cutoff score. Each of the psychometric models of fairness specifies a criterion of fairness. Based on the criterion of fairness, appropriate cutoff scores on the predictor variable is determined. These cutoff scores may vary according to the subpopulations. A detailed description, comparison, and appraisal of the psychometric models is provided by Petersen and Novick (1976).

A two-by-two table displays the relationship between these two variables in a form that is meaningful for analyzing a particular decision-making strategy.

FIGURE 1

	reject	accept
Successful Criterion	False negatives C	True positives A
Unsuccessful	True negatives B	False positives D

reject   accept
Predictor

Under the simplest condition the objective is to minimize the proportion of errors in deciding who to accept and who to reject. Using the cell frequencies in Figure 1, the ratio to be minimized is:

$$\frac{C + D}{A + B}$$

The size of this ratio depends on three variables: the location of the predictor cutoff, the location of the criterion cutoff, and the validity coefficient relating the predictor to the criterion. The location of the predictor cutoff is often constrained by a fixed selection ratio. The selection ratio is the number of position openings to the number of applicants. For example, if there are 10 positions in a particular program, and the number of applicants is 100, then the selection ratio is .10.

Selecting students in educational programs for the gifted is often constrained by implied selection ratios. A policy that calls for admitting only the top 5% of the students in a particular state or district translates into a selection ratio of .05. A very low selection ratio can effectively reduce the number of false positives (students who would have been accepted and failed), given a valid test. However, the number of false negatives (the students who were rejected but who would have succeeded) is increased as the selection ratio diminishes.

Regardless of the number of predictor variables used or the means by which the predictor variables are combined to support a final decision, extremely low selection ratios result in increased utility of decisions only if one ignores the opportunity costs associated with turning away large numbers of students who would have succeeded in the program.

The less valid the predictor and/or the greater the relationship between the predictor and one's level of disadvantage (as reflected by group status, socioeconomic status, etc.) the more severe the equity problem. That is, a number of the false negatives may be disadvantaged. If the predictor variables are not as valid for the disadvantaged groups, then the problem is compounded.

Cronbach (1976) has pointed out the varied implications of differences in the payoff associated with each of the cells in the 2 x 2 matrix. That is, once utilities have been assigned to each of the cells in the matrix, decision strategies can be derived. For example, a conventional assignment of utilities for employment selection would result in a payoff matrix in which only those who are hired and who succeed are given a positive utility. All others would be assigned zero utility to the organization. The decision rule maximizing utility would be favored.

The point to be stressed is that examining the characteristics of a predictor (e.g. test) outside of a decision context does not provide an adequate basis for assessing the utility of that test in selecting students or in assessing the

7

13

"fairness" of the test. Prior information regarding the
relationship between the predictor and the criterion, the
selection ratio, the cutoff score on the criterion, and the
"costs" associated with false negatives and false positives must
be established in order to justify decisions.

The paradigm presented in the previous paragraphs sketches
the application of a decision-theory approach to selection.
Selection implies that those rejected are simply not admitted to
a job or an institution cf higher education. In essence, the
institution has no further responsibility for those rejected.

Educational institutions are generally assumed to be
responsible for providing the most appropriate education
available to all students within resource constraints. The type
of decision being made in educational institutions is typically a
placement decision. Test scores and other information are used
to assign students to treatment A, treatment B, etc. The overall
objective is still to maximize utility, but in terms of placement
there ir no logical necessity to have a fixed quota (i.e.
selection ratio).

An empirical foundation for a sound placement strategy would
require evidence regarding the probability of success in each
alternative treatment, given individual status on some predictor
variables. In order to address fairness of placement it would be
necessary to examine subpopulation membership as it may affect
the benefits to be derived from any particular treatment. Formal
models for expressing optimal placement can be derived from
Cronbach and Gleser (1965). Those models are relatively complex
and require empirical information which is not readily available.

The value system underlying the psychometric models is
utilitarian. The objective of a decision-making strategy under
utilitarian principles is to maximize the expected aggregate
utility derived from decisions. For example, we might take
achievement gain in a specific academic area (e.g. mathematics)
to be the desired outcome of a program for gifted students.
Assuming that the metric used to measure achievement gain is
linearly related to the value placed on the gain and is an

8

11

interval scale, the better of two decision strategies is that which results in the greater achievement gain for the selected and unselected group, provided the costs of the two strategies are equivalent. The selected group receives the alternative treatment and the unselected group receives the regular school mathematics courses. Alternative treatments designed for gifted students typically involve enrichment activities or acceleration of the student through the regular program and beyond.

There are two key points to be made regarding the usual application of maximizing the aggregate utility of decision strategies. The first point is that the same outcome, in qualitative terms, is appropriate for evaluating alternative programs to which two different groups are assigned. Such an expected outcome may involve a higher level construct such as mathematics achievement gains, which is assumed to extend across a wide range of performance and which satisfies assumptions of an interval scale. A scale with interval properties would allow one to average gains across both the selected and unselected groups, which relates to the second point. The placement strategy which results in the highest average achievement gain across the selected and unselected group is the preferred strategy. A placement strategy could consist of any of a number of possibilities, including identifying all students for one of the two available treatments should it be expected that the same program works best for all students. The reigning assumption in targeted programs is, however, that different students should get different treatment.

As a corollary to the second point and consistent with the principle of maximizing expected aggregate utility, small gains or even losses by some could be offset by large gains by others. This implies that it is acceptable for some students to be expected to fail to benefit from either of the two program alternatives as long as some students gain enough to cancel out the losses. Thus the key utilitarian principle, as applied, is intuitively vulnerable to criticism based on justice or equity concerns. Is it just to shift educational resources to maximize

9

15

aggregated utility? The utilitarian school of thought would say yes; maximizing utility and fairness are taken to be identical.

Justice as Fairness

An alternative value system may better reflect the concern that disadvantaged students are under-represented in gifted and talented programs. The implications of such a system for identifying students for gifted programs calls for analysis.

An alternative value perspective is offered by Rawls's (1971) theory of justice. Its significance to evaluators is that it deals with problems of fairness in relation to the distribution of resources, and it conflicts in significant ways with utilitarian values. Evaluators are intimately involved in resource allocation because of their role. House (1976) and Strike (1979) have argued that Rawls's work deserves the attention of evaluators. House (1976) sees direct implications for the details of program evaluation. Strike (1979) sees the implications as a means of sharpening the sensitivity and intuitions of evaluators to issues of justice. Both believe the concept of justice-as-fairness, if incorporated into the domain of evaluation theory, would help in understanding complex value issues often ignored by evaluators or social policy analysts. Thus, the potential of Rawls's theory is that it will allow reasoned treatment of value considerations not yet adequately handled by technical analyses. Interestingly enough, the same arguments have been made for the application of decision analysis in its broadest sense (Cronbach and Gleser, 1965; Keeney and Raiffa, 1976).

Rawls's (1971) theory is based on two major principles.

First Principle

Each person is to have an equal right to the most extensive system of equal basic liberties compatible with a similar system of liberty for all.

10

16

Second Principle

Social and economic inequalities are to be arranged so
that they are both:
(a) to the benefit of the least advantaged,
     consistent with the just savings principle, and
(b) attached to offices and positions open to all
     under conditions of fair equality of
     opportunity.

Application of these principles is based on a priority order.
The first principle takes priority over both parts of the second
principle. No just institutional practice can detract from the
basic liberties of some in order to extend the basic liberties or
provide social or economic benefits to others. An institution
that condones constraining basic liberties of some in order to
further the social or economic condition of others is unjust,
even though the social or economic benefits to its members may be
greater in the aggregate as a result of the constraint. Even
though the first principle is satisfied within an institution,
justice is still an issue in the distribution of social or
economic benefits. Part (b) of the second principle, the
opportunity principle, requires open access to compete for
offices or positions which carry specific social and economic
benefits (e.g. prestige, pay). Finally, where it is necessary to
distribute benefits unequally, the difference principle requires
that they be distributed to the benefit of the least advantaged.

Rawls's theory of justice, also called justice-as-fairness,
is captured, however abstractly, in these two principles. Social
institutions act fairly (justly) when these principles are
followed, and unfairly (unjustly) when they are violated. The
concept of justice-as-fairness is in contrast to a traditional
utilitarian ethic which asserts "the greatest good for the
greatest number". The greatest good for the greatest number is
defined as the sum of satisfaction divided by the number of
people in the population. Utilitarian ethics calls for
maximizing the average utility as a moral obligation. The ends
justify the means. Utilitarian ethics places high priority on
efficiency and technological values within social institutions.

11

17

If the activity of the organization extracts a cost in either economic or social terms then the cost is deducted from the final aggregate satisfaction. Justice-as-fairness demands basic liberties be considered inviolate; not subject to increasing efficiency or maximizing aggregate utility.

Within the justice-as-fairness framework the most important basic liberty is self-respect. Self-respect involves two aspects. First, self-respect consists of "a person's sense of his own value, his secure conviction that his conception of his good, his plan of life, is worth carrying out. And second, self-respect implies a confidence in one's ability, so far as it is within one's power to fulfill one's intentions" (Rawls, 1971, p. 440). Self-respect cannot be bargained away (or taken away) for economic or social goods. A society which arranges its institutions to permit or encourage such tradeoffs is by definition unfair.

Rawls (1971) limits his treatment of justice to the basic structure of society. Strike (1979) reminds us of this limitation, emphasizing that program evaluation practice cannot simply be deduced from Rawls's theory of justice. At the same time an understanding of justice-as-fairness may serve to heighten the awareness of evaluators to value perspectives underlying concerns expressed about particular educational programs. One such concern is that programs for gifted students may result in an educational elite denying opportunities to some students because of their disadvantaged state. This concern, narrowly construed, can lead to a policy of providing "identical educational experiences" to all students (Gallagher, 1979). Better understanding of the concern may lead to adapting evaluation practices, including methods of identifying students and selecting outcomes to be assessed and an increased capacity to communicate information about the worth of educational programs in terms meaningful to policy makers.

12

18

Implications

The issues raised at the beginning of this paper are relevant at every level of policy making and decision making in the educational system. Placement strategies reflect values of utility and equity. A utilitarian con:eption of equity equates maximizing utility in the aggregate with achieving equity. Under the theory of justice-as-fairness, achieving equity is not assumed to be equated with maximizing utility. One must give attention to the effects of placement decisions on basic liberties such as self-respect. The strategy with the least unfavorable (or the most favorable) effect on the self-respect of both those accepted and those rejected would be preferred. More importantly, should a strategy evidence negative effects on the self-respect of members of a particular group, then creating a remedy for the injustice, would be a basic responsibiity of the institution.

A basic assumption underlying either approach to incorporating utility and equity concerns in a placement strategy is that we have a priori knowledge of the differential effects of various educational program alternatives for all significant groups. Another way to put the assumption is that we can draw generalizations from research that would provide the rationale for particular decision strategies.

In reality such a priori knowledge is not readily available. Uncertainty calls for careful evaluation of the decision-making processes involved in developing and implementing education programs. A conservative strategy of placement, for example, would allow for multi-stage decision-making. Preliminary decisions could be made about the best "placement" for a student. These decisions would be revisited to make sure that they were in the best interests of the individuals in terms of building their self-respect and their capabilities.

The operation of the program would be examined in terms of its influence on the self-respect of participants and non-participants. What might be done to build self-respect of all in the day-to-day operation of educational programs would be

13

19

considered. Process evaluation could focus on operational effects of the program.

Finally, summative evaluation would attend to the accumulated influence of a program on self-respect and its distribution among groups, as well as other performance and skills.

This paper began with a discussion of placing students in educational programs. How did it end with a discussion of program evaluation? A basic assumption in placement is that greater overall benefits will be derived if differential educational experiences are provided to students. Evaluating placement decision strategies requires evidence about program effectiveness for different types of students and assessments of the effects of multiple programs on entire populations of students. The usual approach is to examine effects on achievement.

Providing equitable educational experiences could, in theory, also be examined empirically. Such investigations may not meet the same standards of inferential rigor as studies examining effects on achievement. There are complex measurement issues to address in examining equity. In principle, however, judgments of equity and utility in placement could be more data-based whether a utilitarian or justice-as-fairness conception is used to define what is equitable.

Footnotes

[1]Federal legislation governing the use of federal funds in education is slated for major revisions as this paper is being written. While the structure of the ESEA Act of 1965 will be replaced by a new act, fundamental concerns for justice and program development will not disappear.

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