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ABSTRACT

Findings from a study that compared six methods for computing dropout rates are presented in this paper, which focuses on determining those appropriate for use at the local level of administrative decision making. Statewide data obtained from the U.S. Department of Education and from the Division of Management Information Services, Florida Department of Education, were used to compare the following six methods: Simple or Event; Current Population Survey (CPS); Common Core Data (CCD); High School and Beyond (HS&B); Cumulative Dropout (CDOR); and Enhanced Dropout. The uses of each model for each level of the educational hierarchy are described. Findings indicate that the combination of the Event, CDOR, and Enhanced methods provide a clear picture of the local dropout problem. A conclusion is that because dropout rate data obtained from using a particular computation method may not be applicable at every level, local educational decision makers must be aware of the various computation models and the information each provides. (13 references) (LMI)

A Comparative Analysis of Six Methods for Computing Dropout: Their Utility in Educational Decision Making

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INTRODUCTION

The media is replete with chronicles about the status of American education. Many of these center around the issue of school effectiveness as measured by graduation and dropout rates (MacCuish, 1990). Kumar (1977) reported that one indicator of a school system's effectiveness is its dropout rate. Using dropout rates as an indicator of school effectiveness is hindered, however, by the lack of a universally accepted definition of 'dropout' (Barber & McClellan, 1987). Additionally, differences in how dropout rates are reported inhibit meaningful use of the data (Cox, Holley, Kite, & Durham, 1985). Another difficulty according to Zachman (1987) is that educational policy and practices do not adequately address the issues related to dropout. MacCuish (In review) suggested that another contributing factor in addressing these issues are the quality of educational policy and practice decisions. Frequently these decisions are based on dropout rates obtained from a model inappropriate for use at that level in the educational hierarchy. Thus, dropout rates used in educational decision making which are based on an inappropriate model result in less effective educational policy and practice decisions.

OBJECTIVES

As a result of the concerns noted above, a comparative research study was conducted at the University of Central Florida using statewide dropout data obtained from both the U.S. Department of Education and the Florida Department of Education, Division of

Management Information Systems. Six methods for computing dropout rates were analyzed. These methods were the Simple or Event, Current Population Survey (CPS), Common Core Data (CCD), High School and Beyond (HS&B), Cumulative Dropout (CDOR), and Enhanced Dropout methods. Specifically, the intent of the study was to examine each of the six methods to determine which are appropriate for use at the local level.

PERSPECTIVES

There exists in the American educational system an educational hierarchy. It extends from the classroom through the Department of Education in each state and terminates with the Federal Government. At each level in this hierarchy, educational decisions which affect the education of children are made. Some of these decisions are based on dropout rates. For decisions to be effective they must be grounded in information appropriate for that level.

There are four dropout computation methods which are now used in this educational hierarchy. These are the Simple (Event), Current Population Survey (CPS), Common Core Data (CCD), and High School and Beyond (HS&B) dropout rate methods. Three of these were developed by the federal government for specific uses at that level. Agencies, groups, and individuals at other levels, especially in the local school district, however, frequently base educational decisions on dropout rates obtained using one of these three methods. Two additional methods, the Cumulative Dropout (CDOR) methcd and the Enhanced method, have been identified and are

worth considering for use at various levels in the educational hierarchy. These additional models are necessary because some of the models now in use are being used outside their design parameters.

The first method of dropout computation is the Simple or Event Dropout Rate. "Event dropout rates measure the proportion of students who dropout in a single year without completing high school" (Frase, 1989, p. ix). A review of the literature indicates that the Simple (Event) method is universally accepted. Many researchers have used this method in their studies of annual dropout rates (see for example, AISD, 1985; Cox, et.al., 1985; Cleveland, 1986; MacCuish, 1990). It is a descriptive method limited to computing an annual dropout rate, and is the only model which provides an accurate annual dropout rate.

The CPS method is used by the U.S. Census Bureau for providing general population information. The United States Bureau of the Census annually surveys approximately 60,000 households which represent in the order of 150,000 household members. "Was...attending or enrolled in a regular school or college in October, 199_, that is October of last year?" and "What grade or year was...attending last year?" are examples of two of the questions asked about education (Kaufman & Frase, 1990; and Kaufman, McMillen, & Whitner, 1991). Based on the answers to these questions, related questions about education, and the current enrollment information, a dropout rate for each grade is computed. The dropout rate for secondary schools is based on the grade 10

enrollment figure. A cohort's dropout rate, for example, is calculated by taking the number of 10th grade students and multiplying by the 10th grade dropout figure, then taking that product and multiplying it by the 11th grade dropout figure. This product is next multiplied by the 12th grade dropout figure. The result is subtracted from the original number of students entering the 10th grade. This number represents the hypothetical number of current 10th graders who will be graduating from high school. Then, this hypothetical number of graduates is subtracted from the original 10th grade figure and results in the estimated dropout rate. By dividing this figure by the number of 10th grade students, a national cohort dropout rate is obtained. There are no tabulations available for the individual states because the estimates, given the small sample size would be unreliable (Bryant, 1991).

Annually, each state and the District of Columbia furnish the U.S. Department of Education (DOE) a wide range of educational data as part of the Annual Survey of Schools. This Common Core Data (CCD) is provided the Federal Government in raw form. Data collected pertain only to public schools. Secondary school dropout rates are calculated by taking the number of students enrolled in school in the 9th grade and then four years later, determining the number of students who have graduated. Next, the number of high school graduates is divided by the number of students who were originally enrolled in grade nine. Students who earned a General Equivalence Diploma (GED) or other non-standard day school

certificate are not considered as high school graduates. Rather, they are included in the dropout statistic. In addition, DOE factors a migration rate into its formula for computing dropout rates. This migration factor is based on a rate calculated by the U.S. Bureau of the Census. DOE incorporates this migration factor into the dropout equation for each state and the District of Columbia because the United States is such a highly mobile society. (For Florida this rate is +5%.) Thus, the dropout rates within each state are adjusted up or down according to estimated population shifts.

The reported dropout rate for Florida for the 1982-83 school year grade 9 cohort (This cohort graduated in 1985-1986 school year.) was 38%, based on a 62% graduation rate (Lively, 1988; Johnson, 1988). This graduation rate ranked Florida as the state with the second highest dropout rate of the 50 states. Only Louisiana with a dropout rate of 38.2% (Based on an adjusted graduation rate of 61.8%), and Washington, DC with a dropout rate of 43.2% (Based on an adjusted graduation rate of 56.8%) had higher dropout rates (DOE, 1989).

The High School and Beyond (HS&B) method was developed by the Center for Statistics, United States Department of Education. In this study, 30,000 high school sophomores in public and private high schools were surveyed in 1980. This sample was surveyed again in 1982, 1984 and 1986. Raw data were weighted to project a population of 3,800,000 high school sophomores (based on the 1980 year group). Those students who, at the end of the study, did not

have a diploma represented the number of dropouts. This number divided by the beginning sample represented the dropout rate. Since this method was employed only once, there is no way of projecting dropout rates in any other cohort. In addition, the method did not consider those who had dropped out before spring of the sophomore year. As a result of this longitudinal study, DOE has learned that each year the high school completion rate from that cohort has increased as more of its members return to the educational system to earn either a diploma or GED certificate.

The Pittsburgh Public School System (1986) reported on the holding power of that system's secondary schools and from this report is derived the Cumulative Dropout Rate. In this study, the system examined both the annual holding power (AHP) and cumulative holding power (CHP) from the 1980-81 through the 1984-85 school year. Annual holding power was calculated by dividing the end-of-year enrollment (EYE) by the end-of-year enrollment plus the number of dropouts (EYE + D).

Cumulative Holding Power "is determined by computing the percentage of dropouts for each grade level and subtracting that number, cumulatively, from a hypothetical group of 1,000 people entering the lowest grade level served by the school...A student who drops out in grade nine is counted as a dropout in grade nine. He/she is also counted against grade ten holding power because he/she never reached grade ten, or grade eleven, etc. This one student is, in effect, counted against the holding power of a four-year high school four times" (p. 11).

As an example, hypothetical group of 1,000 students enter grade 9. This grade has a, 7.8% drop out rate (Based on the actual Florida statewide annual dropout rate for grade 9 for the 1982-1983 school year) (D).

.078 x 1,000 = 1,000-78=922 (EYE).

922 are expected to enter grade ten which has a 5.5% dropout rate (Determined by dividing the actual grade ten dropout rate by actual enrollment rate [D/enrollment] for grade 10 in the 1982-1983 school year).

.055 x 922 = 50.71-922 = 871.29

871.29 are expected to enter grade eleven which has a 6.0% dropout rate (Actual statewide grade 11 dropout rate, 1982-1983).

.06 x 871.29 = 52.28-871.29 = 819.01

819.01 are expected to enter grade twelve which has a 3.4% dropout rate (Actual statewide grade 12 dropout rate, 1982-83).

.034 x 819.01 = 27.85-819.01 = 791.16 or CHP of 79.1%.

The inverse of the Cumulative Holding power is the Cumulative Dropout Rate (CDOR). If a school's CHP is computed to be 79.1%, then the theoretical dropout rate of the school is 20.9% (Estimated Florida statewide dropout rate for the 1982-1983 grade 9 cohort which graduated in 1985-1986). This estimated dropout rate is based on the notion that in determining CHP, only the number of dropout and enrolled students are considered.

In this study, a method developed by the investigator and identified as the Enhanced (MacCuish) Model, was also used to calculate the dropout rate. This method differs from the other

cohort dropout rate methods (CPS, CCD, and HS&B). It is the only method which includes in the formula students who are retained in grade. Thus, in this method grade enrollment, dropout, and retention rates are used.

A cohort dropout rate was determined by first taking the enrollment figure for grade 9 and subtracting the dropout and retention rates for grade 9. The resulting figure was the end-of-year enrollment rate for grade 9. The grade 9 end of year enrollment rate was subtracted from the cohort's next year's grade 10 enrollment rate. This figure was then added to the grade 9 enrollment rate to obtain a two-year cohort enrollment figure. This cohort's grade 10 dropout and retention figures were then subtracted from the grade 10 enrollment figure to obtain the grade 10 end-of-year enrollment rate. This figure was then subtracted from the cohort's grade 11 enrollment rate. This process was continued until the total cohort enrollment figure for the four secondary school years was determined. Next, the cohort's number of dropouts was determined. This figure was then divided by the cohort's total enrollment figure. The result was the cohort's four-year dropout rate.

For example, the total Florida statewide enrollment for the 1982-1983 grade 9 cohort group was computed to be 124,308 plus 17,143 (123,649-106,506), plus 8,247 (106,659-98,307) plus 263 (90,510-90,247) which equaled 149,956 total membership for the 1982-1983 grade 9 cohort (See Table 1). The total number of dropouts was identified to be 29,898 individuals. By dividing the

number of dropouts by the cohort membership, a dropout rate of 19.94% was obtained. This figure is significantly lower than the 38% reported by Johnson (1988).

TABLE 1

1982-1983 GRADE 9 TOTAL COHORT SUMMARY COMPUTED USING THE ENHANCED MODEL

YEAR	GRADE	ENROLLED	RETAINED IN GRADE	DROPOUT	END OF YEAR ENROLLMENT
82-83	9	124,308	12,042	5,760	106,506
83-84	10	123,649	14,309	11,033	98,307
84-85	11	106,549	7,755	8,547	90,247
85-86	12	90,510	3,159	4,558	82,793

DATA SOURCE AND METHODS

Two data sets were used in this study. The first set was obtained from the United States Department of Education and is the data that office used to compile the results of the Annual School Survey. Information included in this set were only statewide data for enrollment, graduation, retained in grade, and dropout for the years studied. It is from this data set that the Department of Education computes graduation and dropout rates.

The second data set was obtained directly from the Management Information Services Division, Florida Department of Education. This second set also contained enrollment, graduation, retained in grade, and dropout data. In addition, this data set is the source of the statewide data provided by the U.S. Department of Education as the first data set. A comparison of the years covered by the two data sets is as follows:

Data Set I	Data Set II
United States DOE	Florida DOE, MGT INFO SVCS
School Years Covered	
1975-76 to 1986-87	1982-83 to 1987-88

Data used by the U.S. Department of Education (DOE) were of interest because DOE is the agency which calculates and reports dropout rates across the United States. The U.S. Department of Education determines which state has the highest and lowest dropout rates. Raw data from both data sets were compared (CCD baseline and state survey) to identify any discrepancies. Statewide dropout rates were computed and compared for the years cited using each of the dropout methods, as possible.

RESULTS

Statewide dropout rates based on grade, gender, and ethnicity were computed for both data sets using the simple dropout rate method. The simple rate facilitated comparisons of each year's dropout rate to previous ones. It is a good method for use in reporting or comparing annual dropout rates at the national, state, school district, school, and grade levels. It is also good for analyzing dropout rates based on gender, ethnic and socioeconomic groups, etc. Because of its versatility, it is useable at every level in the educational hierarchy. It can also be used outside the educational hierarchy.

Dropout rates using the CPS method could not be computed with the data available. The researcher had to refer to census documents for information on dropout rates. This method provides information which is general in nature and as a result has limited utility in education. It is, however, appropriate for users of Census or general information.

One difficulty uncovered with the CPS method is that the survey's baseline data are dependent on the accuracy of the answers to the questions from a randomly selected group which is thought to represent the American population adequately. Proponents dismiss this problem arguing that the CPS database provides reliability indices which minimize inaccurate answers to questions. Two other limitations are the CPS survey does not include military personnel or their families living on military posts (Peng, 1985), nor does it include residences without telephones. Also, the accuracy of the migration factor is speculative. Because of the small sample size, reliable estimates of dropout rates for each state and the District of Columbia cannot be computed (Bryant, 1991). The CPS dropout rate, however, is the only existing national data source which can be used to estimate the annual dropout rate irrespective of when the event actually occurred (Frase, 1989).

Dropout rates based on this method are inappropriate for educational decisions about apportionment of monies for specific title programs, or for those requiring specific data such as those made by the U.S. Department of Education and state agencies. In addition, dropout rates derived from this method are not well

suited for analyzing dropout rates or making comparisons based on grade, gender, or race. CPS is only appropriate for use by agencies which require general or non-specific information. It does provide some predictive information.

Cohort dropout rates were also computed using the Common Core Data method. One problem with the nationwide Annual Survey of Schools Database is there is no standard definition of a 'dropout' (Barber & McClellan, 1987; Hahn, 1987). Thus, the numbers reported in the category of 'dropout' by each state and the District of Columbia are not based on a standard construct. This method depends on the accuracy of the input of the local school and the definition of dropout used. As a result of these two difficulties the data may be considered spurious. In fact, this is a complaint aired in casual conversation with many school officials.

For example, the state of Florida's reported 1986 dropout rate of 38% was based on this method (Lively, 1988). In computing the 38% dropout rate for the cohort which graduated in 1986, the U.S. Department of Education added to the cohort's enrollment number a 5% migration figure which was obtained from the Department of Census [81,508/124,308 = 65.57% graduation rate or 34.43% dropout rate. 81,508/(1.05x124,308) = 62% graduation rate or 38% dropout rate].

In deference to its limitations, the CCD method is used to evaluate a variety of programs at most levels in the hierarchy. Although the U.S. Department of Education (DOE) is interested in dropout/graduation rate data, the office within DOE which developed

this method is not responsible for programs involving students who obtain a non-standard diploma, graduate with a cohort different from their original cohort, reenter the educational process after having dropped out, or earn a GED. These programs are the responsibility of other offices within DOE. As a result of this division of effort and responsibility the various data sets and statistics (graduation rates, special education program evaluations, GED program results, etc.) are not brought together by any one office within DOE. Thus, they are not incorporated together into the educational decision making process. Therefore, educational decisions are often based on incomplete or conflicting data from different offices within the same agency.

CCD is an appropriate method for computing Simple (Event) dropout rates and high school graduation rates of students who receive the traditional diploma from American public secondary schools. It also is appropriate for use by federal agencies such as the Department of Education and the General Accounting Office in program evaluation of certain federally funded general education programs. However, it is an inappropriate method for comparing dropout rates of states, school districts, schools, grades, and cohorts. In fact, this method does not do what it purports to do and therefore lacks the utility necessary as a research tool.

Dropout rates using the HS&B method could not be computed using either of the two data sets. This was due to the nature of the research study from which this model was derived. Because the HS&B method was developed to conduct longitudinal research, it is

an inappropriate method for use outside the research context. The HS&B study produced excellent results, and is being somewhat replicated through the National Education Longitudinal Study (NELS:88) project. In this effort the 8th grade 1988 8th grade cohort is being studied. It is anticipated that this study will be the first research effort to investigate dropouts on a national scale and to study the effects of transitioning from grade 8 into high school (Issue Brief).

Dropout rates using the CDOR method were computed using the second data set. This method, as previously noted, is a predictive method for computing dropout rates. It provides educational decision makers with an accurate predicted dropout rate for a specific cohort based on current data. As a result, this method has little utility by when used by itself. However, when used with other methods such as the Simple (Event) and Enhanced computation methods, educational leaders can use these data effectively to evaluate, adjust, or discontinue educational programs.

This model, then, gives educators the ability to modify an intervention before the cohort exits the educational program. Because of this predictive quality, the CDOR method is particularly useful at the state level and below. If predictive data are required at higher levels in the educational hierarchy, this method could be used there as well. Due to the complexity of computation of the CDOR method, however, the CPS method, which is reported annually, may be more appropriate at the national level.

Dropout rates using both data sets were also computed using the enhanced model. This model is a descriptive method oriented to computing a cohort's actual dropout rate. It is not based on a graduation rate or figure. It is a viable method for describing the dropout rate of a subgroup within a cohort. This method is based on the total enrollment of a cohort. It accounts for students who were retained in grade or dropped out of school before completing their educational program. It does not include a hypothetical migration figure. It is based upon actual cohort membership. When used with both the Simple and CDOR methods this method provides users with important factual information upon which effective educational decisions can be made (MacCuish, In review). This method is most appropriately used at the state level and below. When used with other methods, specifically Simple and CDOR, it also has utility in research, program evaluation, and reporting of statewide cohort dropout histories. Computing the dropout rate by the Enhanced Method is time consuming. Thus, this method may be incompatible with the reporting requirements of many agencies and groups above the state level. Selection of this method of dropout rate computation, as with the other methods, must be based on the needs of the using agency.

SIGNIFICANCE

Educational policy analysis, program evaluation, and decisions are only as effective as the information upon which they are based. This is particularly true about dropouts. One problem which has

been identified with using dropout rates as a basis for making educational decisions is that the input data are based on computation models which were not designed for the purpose they are sometimes used. As a result, decisions are flawed.

This study investigated several models of dropout computation and identified locations in the educational hierarchy where derived data would be appropriate for basing educational decisions. Herein lies the significance of this study. Selection of the correct model to provide the information required to make better educational policy and practice decisions, especially at the local level, is important. For example, when the Event, CDOR, and Enhanced methods are used together at the local level a clear picture of the dropout problem emerges. These three methods when used collectively enable educators to predict not only future dropout rates, but evaluate current educational programs, and improve the quality educational decisions affecting educational policy and practice.

CONCLUSION

Many of the educational decisions made at the local level are based on dropout rate data obtained from one of the three methods developed by the Federal Government. Both the CPS and CCD methods are only appropriate for use at the Federal Government level. The HS&B method is appropriate for research only, and provides valuable longitudinal information. For example, a research study employing this method should be conducted in Florida. The Simple method has

the utility to be used at every level in the educational hierarchy. When predictive information on dropouts is required at the local or state levels then the CDOR method is appropriate. It is the only method which provides this type of information. The Enhanced Method provides the user at the state and local levels with accurate dropout rate information for any specified cohort. It is an inappropriate method for use above the state level. Use of the Simple, CDOR, and Enhanced Methods at the local level provides valuable dropout rate information for making specific policy and other types of educational decisions.

We must remember that the dropout rate data obtained by using a particular computation method may not be suited for use at every level. At the local level decisions require specific input data. Thus, educational decision makers in the local school district must be aware of the various computation models and the information each model renders. An additional consideration for the local educational decision maker is that one method of dropout rate computation does not provide all the information necessary to make the best educational decisions.

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