# Forecasting Future Trends in Education

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*According to a University of Florida study, National Assessment reading test scores of 13-year-olds will decline by 1981—if present educational and social trends continue. To counter negative trends, a holistic approach involving home, school, and community efforts is suggested.*

What will be the future trends in educational outcomes? Will achievement test results go up or down by 1981? Educators and policy makers have long sought answers to questions such as these.

The writers forecast that selected achievement test results will decline by 1981 if present trends within schools and society continue. The forecast is based on a study using a forecasting model sensitive to the major factors influencing educational outcomes. This article describes the forecasting model, presents forecasts, and gives implications of these forecasts, including ways to subvert them.

## Description of Forecasting Model

Any forecast is based on a set of assumptions regarding trends. For example, weather forecasters use a series of maps that show such elements as barometric pressure, temperature, humidity, force and direction of the wind, cloudiness, and precipitation. They study changes in these elements assuming that their interaction will produce "the weather." By constructing several such maps each day, forecasters can note trends in these variables and, by assuming that these trends will continue, can forecast the local weather. It is well to note that in spite of relatively sophisticated instruments and measurements, including photographs from satellites, forecasters sometimes miss the mark when anticipated trends are not realized.

Assumptions used in forecasting educational outcomes are related to trends in variables that will influence these outcomes. Therefore, a review of research on variables affecting educational outcomes was a necessary first step for the writers. Through that review, a series of variables was identified (Collazo, Lewis, Thomas, 1976). There was strong support from research for two variables that affect educational outcomes: socioeconomic status of student's family and student's general ability. However, there were a number of other variables identified as important in the theoretical literature, but which had inconclusive support from research. In order to determine

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which of these variables should be used in the forecasting model, a panel of eleven members at the University of Florida was consulted.[1]

Through the use of a modified Q-sort, the panel selected the following variables as having the greatest potential impact on educational outcomes:

1. Socioeconomic status of the family;
2. Family expectations, attitudes, and aspirations toward the student's education;
3. Student self-concept;
4. Student general ability as measured by IQ tests;
5. Student attitudes and motivation for achievement;
6. Student sense of fate control;
7. Peer-group attitudes toward education;
8. Teacher expectations regarding learning ability of specific students or classes;
9. Teacher behavior in the classroom—how the teacher actually carries out the tasks of teaching;
10. Administrative leadership style.

The first assumption made in the forecasting model was that trends in the ten variables identified would affect measures of educational outcomes. In order to forecast trends in educational outcomes, it was first necessary to determine trends in these ten variables. In the absence of data on past and present trends, future trends in variables were stated by panel members based on their knowledge. The following trends were identified:

1. Percent of children living in poverty will increase;
2. Family expectations, attitudes, and aspirations will decline;
3. Positive student self-concept will decrease;
4. Student ability as measured by IQ tests will decrease;
5. Positive student motivation and attitudes toward school will decrease;
6. Students' sense of control of their own fate will decline;
7. Peer-group expectations, attitudes, and aspirations relative to education will decline;
8. Teacher expectations of student performance will decline;
9. Teacher behavior with respect to instructional practices will improve;
10. Leadership styles and organizational climate of schools will improve.

Educational outcomes were also stated as trends. The specific educational outcome considered in this article was that the National Assessment of Educational Progress (NAEP) reading test scores of 13-year-olds will increase.

In analyzing these trends, it became apparent that the effect of one variable on an educational outcome is not independent of the effect of other variables. For example, if teacher expectations of student performance decline, this would have a negative impact on achievement test results. However, in addition, this trend in teacher expectations may contribute to a lower self-concept among students, which in turn will have a further negative influence on test results.

The difficulty of interacting variables was overcome through the construction of a cross-impact matrix (Kane, 1972). Through the use of such a matrix, it is possible to visually display the trends in the variables, their interactions, and their impact on educational outcomes. This reduces the magnitude of the problems of simultaneously considering the interaction of all the trends by considering the interaction of only one pair of them at a time.

The first step in using the cross-impact matrix was to estimate the probability that each trend would occur independent of other trends. This was referred to as the *initial probability*. However, the assumption inherent in a cross-impact matrix is that the initial probability of the occurrence of a trend will be modified by the impact of other trends in the set included in the matrix. It was necessary, therefore, to estimate the probability of occurrence of each trend based on the impact of other trends in the matrix. This modification of the initial probabilities, referred to as *conditional probabilities*, was also estimated by the faculty panel.

Once the cross-impact matrix was con-

[1] Panel members were from the Department of Anthropology, Counseling, Curriculum and Instruction, Educational Administration, Foundations of Education, Political Science, and Sociology.

structed, it was possible to analyze the cumulative impacts of all the trends upon one another through the use of a computer program.[2] The program computed new values for the initial probabilities of each trend in light of the probabilities of occurrence of each of the other trends and the estimated impact of all the trends on each other. These shifts in the initial probabilities of occurrence of trends may be used for making forecasts. For example, an initial probability of .50 was assigned to the trend: NAEP reading test scores for 13-year-olds will increase. Based on the assumptions made regarding the ten variables, the computer produced new values for the initial probabilities of occurrence of that event that ranged from .17 to .97.

### Forecasts

As in any forecasting model, the forecasts depend upon the assumptions that are made. In every case, forecasts were made for 1981. One forecast assumed a "rosy world." Probabilities were assigned to the trends in the variables such that all of them would change in positive directions. Thus, it was assumed, for example, that the percentage of children living in poverty would decrease, that student self-concepts would improve, and that teaching would improve. Even though the initial probabilities assigned to the trends in the variables were not excessively high (.55 to .70), the computer program changed the probability that NAEP reading test scores would increase from .50 to .97. In other words—from even odds to odds of approximately 32 to 1.

A second forecast was based on the assumption that present trends in the variables would continue. Unfortunately, there was little information available regarding these trends. It was found that the percentage of children living in households below the poverty level has increased. There is also some evidence from research that children's sense of control of their own fate has declined. In addition to this evidence, we relied on the judgment of the faculty panel in assigning initial and conditional probabilities. When this matrix was run on the computer, the probability that NAEP reading test scores of 13-year-olds would increase dropped from .50 to .17. In other words, if present trends in the variables—as defined by the panel of experts—continue, NAEP reading test scores of 13-year-olds will decline by 1981.



A third forecast was based on the assumption that the variables traditionally considered as being under the control of the school would all change in a positive direction (probability of .90) while the out-of-school variables would reflect present trends (as in the second forecast). The computer run on the third matrix produced a probability of .25; in other words it forecast that NAEP reading test scores of 13-year-olds would decline by 1981.

One interpretation of the results of this study might be that the influence of community factors is so great that schools cannot counteract a poor home and community environment. It is true that the study supports the contention that the community exerts a powerful influence on educational outcomes. At the same time, the

[2] For a complete description of the matrix and the computer program, see: Collazo, Lewis, and Thomas. *Forecasts of Selected Social Indicators of Educational Outcomes and Recommended Policy Changes.* Final Report to the Department of Education Project on Social Indicators. Gainesville: University of Florida, 1976.

study supports the importance of the school. More importantly, the study highlights the crucial importance of the effective interaction of school, home, and community in relation to educational outcomes.

The interaction between school and home becomes apparent when considering the trend that the percent of children living in poverty will increase. An inspection of the matrix showed that this trend had a greater impact on the other variables than did any other trend. This finding is in agreement with previous studies that emphasize the importance of socioeconomic status on student achievement. If socioeconomic status (in this study represented by the trend: percent of children living in poverty will increase) has such an impact on the other variables and thus on educational outcomes, what has an influence on socioeconomic status? Socioeconomic status is generally measured by the level of income, the amount of education, and the occupation of the head of the household. But what factors influence level of income, amount of education, and occupation of an individual? Clearly, one of the most important factors is the amount and quality of education of the individual! This is not to refute the factor of socioeconomic status of family in determining the socioeconomic status of an individual. Indeed, it is through giving their children a high-quality university and professional school education that many upper-income parents pass on their affluence.

Thus, there is a mutually dependent and "spiraling relationship" between education and socioeconomic status. The extent and quality of an individual's education will affect his or her socioeconomic status which will in turn affect the educational achievement of his or her children. Educational achievement will affect the socioeconomic status of later generations. For 194 years after the founding of this country the spiral was generally up, with socioeconomic status improving each generation, at the same time that educational achievements improved. The past six years have witnessed a downturn in the spiral with an increasing number of children living in poverty and having declining test scores.

Periodic fluctuations in economic progress can be confused with long-range trends. If this is another periodic fluctuation, the effect will be short-lived and limited in scope. If events prove otherwise, and a general decline has been reversing previous trends, the educational results could be grave.

## Implications of Forecasts

The findings of this study in no way suggest that the school should take a defeatist attitude. Rather, the findings emphasize the necessity for a concerted effort to influence as many variables as possible. Simply changing methods used in teaching or providing new materials will probably not reverse a general downward spiral. Nor will passing laws on standards, minimum competencies, and accountability. If there is one lesson to be learned from this research it is that simplistic answers must be replaced by holistic approaches that involve the community, the home, and the school.

Teachers have the opportunity to influence a number of variables—ordinarily thought of as out-of-school variables—associated with educational outcomes. For example, through their contacts with parents, teachers can influence both parental expectations and aspirations for the education of their children. Through their interaction with students in the classroom, teachers can influence students' self-concepts, their sense of control of their own fates, and their motivations and attitudes toward school. Paying attention to these variables may have a greater impact on NAEP reading test scores than adopting a new approach to the teaching of reading or increasing the amount of time for reading.

Teachers can be helped to see the effects of their pre-judgments on pupil performance. Braun (1976) has made a comprehensive review of the research on teacher expectations and pupil performance. The research shows that teachers develop expectations for student performance based on such student characteristics as: name, sex, physical appearance, success of siblings, ethnic background, and IQ scores. The research further indicates that these expectations result in differential treatment of students in the classroom (for example, grouping of students and nature of assignments given). This differential treatment in turn affects a student's attitude toward school and motivation, as well as self-concept. In a cyclical fashion the student's self-expectation reinforces the teacher's expectations for the child.

The forecasting model itself can be used to test possible policy decisions. This can be illustrated by current proposals that grade standards be instituted and children be required to repeat the grade unless they meet these standards. Proponents of this approach argue that a return to minimum standards would result in greater achievements by students. This assumption can be tested by considering the impact of failing a student on the variables in the cross-impact matrix. It is probable that failing a grade would have a negative impact on at least five of the ten variables:

- Family expectations, attitudes, and aspirations toward the student's education;
- Student self-concept;
- Peer-group attitudes toward education;
- Student sense of fate control;
- Student attitudes and motivation for achievement.

The use of the forecasting model leads to the conclusion that the proposed policy on failure would be counter-productive. This conclusion is consistent with the research cited by Franseth and Wilhelms (1975).

The use of the forecasting model does not necessarily support a policy of automatic social promotion. For some students, social promotion may have a negative impact on the five variables previously listed. Consider, for example, the variables in relation to a student who reaches high school through automatic promotions, but who cannot read. The delay of the impact of failure does not lessen its effect. The model would appear to support a policy of continuous progress in a nongraded system of education in which the student can learn to read without having to fail a grade.

## Conclusion

One hazard in making forecasts such as those presented in this study is that teachers and parents may assume that little can be done to improve the situation. This attitude leads to the worst kind of self-fulfilling prophecy. Lasswell (1975) said:

> Over the long pull, no specific outcome, especially if repugnant to human dignity is "inevitable." If we mobilize our resources of knowledge and motivation, we can pass beyond the status of passive instruments of history and become its most effective principals. It is this mobilization that I believe should preoccupy public education.[3]

We know that dedicated and skilled teachers with appropriate teaching conditions can, in fact, improve the quality of education. The challenge is to "mobilize our citizens' resources of knowledge and motivation" regarding education so that teachers will have the necessary understanding and cooperation of parents and of the community as a whole. EL

[3] H. O. Lasswell. "The Future of Government and Politics in the United States." In: L. Rubin, editor. *The Future of Education: Perspectives on Tomorrow's Schooling.* Boston: Allyn and Bacon, Inc., 1975. p. 21.

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