

Research for Teachers

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"This article is one of a series intended to help ETFO members become more aware of current research findings directly relevant to teaching in elementary schools."

4 PREDICTION

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Teachers often feel that they can predict students' futures; that we can tell by, say, age 6 or 8 students' academic destinies. This view is strengthened by studies that show a strong relationship between various characteristics of students, such as their socio-economic status or their school readiness, and their later achievement.

In fact, predictions of this kind are fraught with problems. Quite a bit of evidence shows that predictions about students' futures are wrong often enough that one should be very, very cautious in making any assumptions about what will happen in the future based on current performance. It turns out that while we can predict population outcomes, such as the percentage of students that will go on to post-secondary education, that does not mean at all that we can predict individual outcomes – such as which students will go on.

Let's consider some examples. In the early 1980s, as part of special education legislation, Ontario mandated an early identification program for all students entering elementary schools. A number of studies compared the predictions of these various tools with students' subsequent school performance and found quite low relationships – "only slight better than chance" concluded one study (Stone, Gridley & Treolar, 1992). Manitoba research from the Centre for Health Policy (Brownell et al., 2004) showed strong relationships between socio-economic status and school outcomes, but also significant numbers of students whose performance did not match the expectation based on background. In a study of 5000 children (Morgan et al., 2009), only 65 percent of those with serious mathematics difficulties in kindergarten still exhibited those difficulties in fifth grade. Another study (Badian, 1988) of 400 students over nine years found that kindergarten reading performance predicted only 75 percent of those who were poor readers eight years later. While 60 or 75 percent may seem a high rate, it actually means that a very large number of students will be judged wrongly. Canadian data (OECD, 2010) show that more than 40 percent of students scoring at the bottom reading level at age 15 were in post-secondary education at age 21. In a review of research on high school graduation, Gleason and Dynarski (2002) concluded that even a whole set of variables taken together resulted in too low a degree of accuracy to have much predictive values. Many other studies have come to similar conclusions; our predictions turn out to be wrong much more often than most of us think.

How can this be? There are both mathematical and substantive reasons for the gap between a belief in prediction and the actual evidence. Mathematically, a correlation between two variables, such as school readiness and grade 4 reading, of, say, 0.8 is very high. Yet it is far from perfect and means that for quite a few students – 20 percent or so – the predicted relationship will not hold. A significant number of students who start poorly will later recover, and another significant number who start well will later decline. That is what the studies cited above show. The more years over which a prediction extends, the less accurate it will generally be.

Substantively, the key thing to remember is that people can and do change. History is not destiny. We know that with the right supports, most people can achieve far more than anyone thought they could. In an important way, part of the job of schools is to make those negative predictions less likely to be true – for example by reducing the relationship between family background and student outcomes.

What does all this mean for teachers? Two implications are important. First, we should be very cautious in assuming that we know the future for any student, since the evidence is so clear that we may be wrong. Second, we should do as much as we can to ensure that students are able to be successful in future, whatever they may have done in past. Possible indicators of a poor future should be a call for action in the present.

Further Reading

Badian, N. (1988). The Prediction of Good and Poor Reading Before Kindergarten Entry: A Nine-Year Follow-Up. *Journal of Learning Disabilities* 21(2) 98-103

Brownell M., Roos, N., Fransoo, R., Guevrèmont, A., MacWilliam, L., Derksen, S., Dik, N., Bogdanovic, B., & Sirski, M. (2004). How do educational outcomes vary with socioeconomic status? Key findings from the Manitoba Child Health Atlas 2004. Winnipeg, MB. Manitoba Centre for Health Policy.

Bowers, A. (2007). Grades and Graduation: Using K-12 Longitudinal Cohort Data to Predict On-Time Graduation. Paper presented to the American Educational research Association, Chicago

Gleason, P., and Dynarski, M. (2002). Do we know whom to serve? Issues in using risk factors to identify dropouts. *Journal of Education for Students Placed at Risk*. 7(1), 25-41.

Morgan, P., Farkas, G. and Wu, Q. (2009). Five-Year Growth Trajectories of Kindergarten Children with Learning Difficulties in Mathematics. *Journal of Learning Disabilities* 2009 42: 306

OECD (2010). Pathways to success: How knowledge and skills at age 15 shape future lives in Canada. Paris: OECD.