Attrition Rate Trend Reversed, Pushing Zero Attrition Rate Farther into the Future

by Felix Montes, Ph.D.

For the first time since we have been doing this forecast analysis (nine years), the annual attrition rate has worsened when compared to the previous year. Last year, the attrition rate was 24 percent; this year, it was 25 percent (see Page 3). Since 1985-86, when IDRA started calculating the attrition rate on an annual basis, there have been only four reversals. First, in 1987-88, the attrition rate went down to 33 percent from 34 percent the previous year. Second, in 1991-92, the rate went up to 34 percent from 31 percent. In 1997-98, the rate took the downward trend until last year, as the rate went down to 42 percent from 43 percent – the highest value ever calculated by the IDRA annual analysis.

And now, after 17 years of slow decline, the rate reversed to 25 percent, after reaching 24 percent last year, the lowest level ever calculated by the IDRA annual analysis. The last time an upward reversal happened (1991-92), the new upward trend continued for five years. Will this happen again?

To answer this question and estimate when the attrition would reach zero at the present speed of decline, IDRA conducted this supplemental inquiry to the Texas high school attrition study. The investigation used linear regression analyses to predict when the attrition rate would reach negligible values.

This forecast analysis is a recurrent feature and each year is added to the full review IDRA devotes to this topic in October. This article represents this year's update to the forecasting analysis with the most recent attrition figures. IDRA's latest attrition study shows that the attrition rate rose, which continues to put the state 20 years away from reaching an attrition rate of zero.
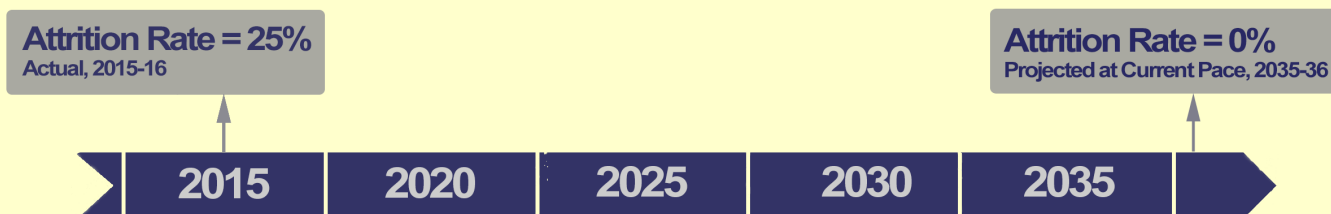
This year's attrition rate of 25 percent was within the range predicted by IDRA's analysis last year, between 22 percent and 30 percent. The predictions for next year are shown in the box below (between 22 and 29 in green, with 25 percent as the most likely value). The chart first plots the attrition historic

Historic Attrition Rates and Next Year Forecasted Attrition Rates

Intercultural Development Research Association, 2016.
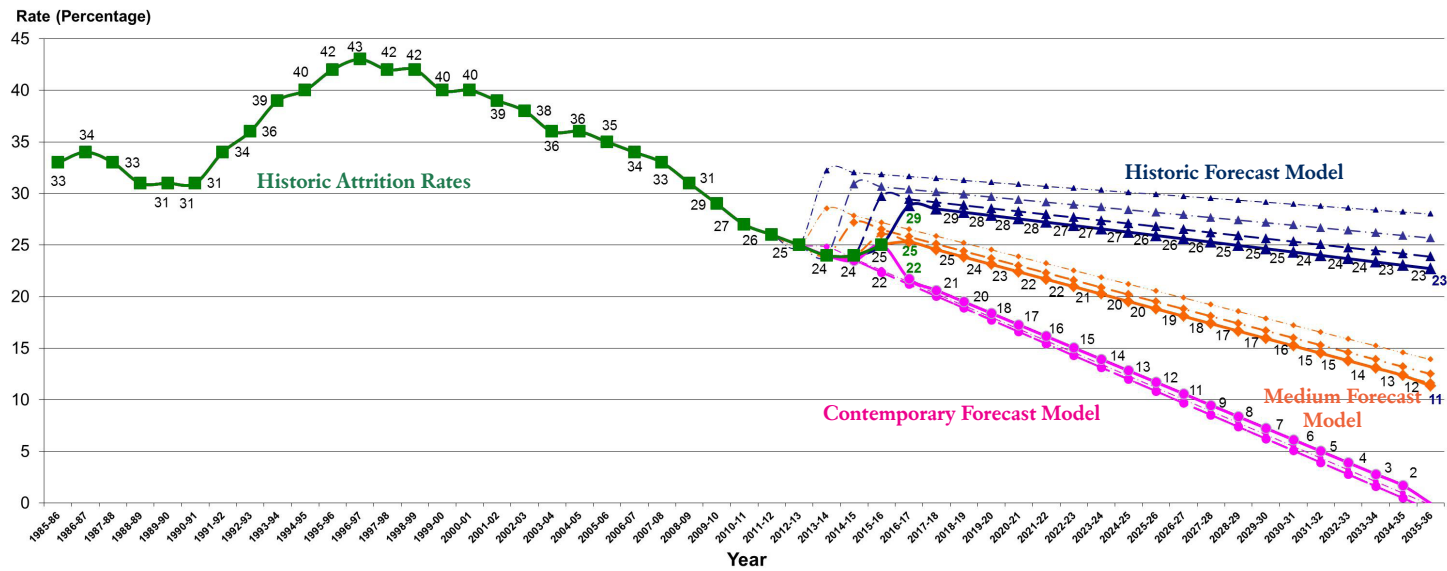
Universal high school graduation is at least a quarter of a century away

Texas stands to lose another 2.25 million students.

Attrition Rate = 25%
Actual, 2015-16

Attrition Rate = 0%
Projected at Current Pace, 2035-36

| 2015 | 2020 | 2025 | 2030 | 2035 |

Intercultural Development Research Association, 2016.

values (green dots), followed by the forecasted values for the next 20 school years (2016-17 to 2035-36).

The new prediction moves the zero attrition date forecasted to the year 2036 from 2035 last year. As this result implies, the overall picture changed little, as evidenced by the similarity between the revised forecasting analyses, which present the forecast for next year (the heaviest lines) and the last three forecasted rounds (progressively lighter lines as time moves into the past).

However, one important change occurred in the contemporary model. The most recent line moved upward with respect to the previous year, signifying a reversal of the trend of moving the zero attrition closer to the present – a less optimistic outlook.

Forecasting Models

The forecasting analysis uses three models. The **Historic Forecast Model,** takes into account all known attrition values, from 1986 to the present, as determined by the annual IDRA longitudinal attrition study. This model assumes that each past rate has equal weight over future rates.

For this model, most future attrition values within the model time horizon would be higher than the current value, since the model constructs the recent downward trend as a cyclical bottom within the long-term progression of the curve. Therefore, it suggests that an upward reversal is overdue. As this year's result shows, this model was correct in predicting a reversal. In this formulation, for 2016-17, the attrition rate will increase to 29 percent. After that, it will begin a slow decline, initiating another downward trend.

In this model, after 20 years, the attrition rate will be 23 percent. This model is depicted in blue in the chart on Page 21.

The second model assumes that the downward trend that started in 1996-97 is a more reasonable predictor of future attrition values. The fact that these are chronologically the most recent values supports this assumption. The recent past is usually more relevant to the present than the distant past. Consequently, this **Contemporary Forecast Model** uses the values corresponding to the school years 1996-97 to present, which represent the subsection of the historic series portraying the current downward trend.

This model predicts a 22 percent attrition rate for 2016-17, which is three points below the current attrition rate. After that, it will progressively decrease by one or two points annually until it will reach zero in the school year 2035-36 (one year farther from the last year forecasting, 2034-35). This model is depicted in pink in the chart.

The third model takes a centrist view between the historic and contemporary forecast models. Mathematically, this **Medium Forecast Model** is formed by applying the medians between the pairs of corresponding two model values within the model's time horizon. Given the current reversal and the strong influence of the past, this model predicts attrition rates to first remain the same at 25 percent in 2016-17, and then to resume the downward trend in subsequent years.

According to this model, after 20 years, the attrition rate will be 11 percent. This model is depicted in orange in the chart.

These models should not be understood as competing or alternative approaches; rather, they complement each other. The contemporary model is more useful for short-term predictions, such as estimating the attrition rates for the next few years. The historic model provides a more long-term view.

Absent of some fundamental changes, history tends to repeat itself. The medium model is useful for medium-term predictions and tries to bridge the gap between the contemporary and the historic models.

Since time in the long-term future is difficult to visualize, the medium forecast model might provide a more practical reference for planning purposes. Notice that another consequence of this year's attrition reversal was the collapsing of some of the dotted lines (prior year continuation trends) for the medium and contemporary models, which now appear to have three lines each. In fact, all four are present but one is underneath another.

Best Fit

The box on Page 23 shows the performance of the three models throughout their nine-year application. For each model, its forecasted values and residuals – the difference between the forecasted and the actual values – are listed for each school year. The smallest residuals correspond to the model that best fits the data so far.

Until last year, the contemporary model, with residuals between zero (no difference) and two was the model that best fits the data and suggested a continuous downward trend. However, the current result indicates that this model was too optimistic as this year it undershot by 3 points (a difference of -3). Last year, the medium model missed the actual value by just 1 point. And it suggests that the attrition rate will remain the same at 25 percent next year.

However, over the nine-year period, the contemporary model continues to be the best fit overall (mean residual = 0.8). Because of this, IDRA used this model to forecast the year when the attrition rate will be expected to reach zero, listed in the last column in the box below.

The most current forecasting indicates that 2036 will be the year when attrition will reach zero. The contemporary model indicates that the attrition rate will reach single digits in the late 2020s and will progressively decrease to minimal values from there.

Thus, we are still at least 20 years away from achieving a zero attrition rate, at the current pace of improvement, with many children lost in the intervening time – the topic for the next section. In addition, it is essential to keep in mind that the contemporary model is the best fit for now, as further demonstrated by this year's reversal. Since there isn't a clearly discernible cause for a sustained attrition decrease over time, the current trend might prove to be cyclical, as the other models suggest.

Forecasted Student Losses

To understand the severity of the situation, we used the updated three forecast models to estimate the number of students that will be lost to attrition before the contemporary model predicted rate reaches zero (see box above).

The historic forecast model predicts that more than 2.5 million students will be lost to attrition from the 2016-17 to 2035-36 school years. The contemporary model yielded a figure of 1.78 miliion, and the medium forecast model more than 1 million.

Conclusions

- If we take the full historic values as a guide, the student attrition rate should be expected to increase to 29 percent next year and then remain between 23 percent and 29 percent for the foreseeable future. Under this scenario more than 2.5 million additional students will be lost to attrition by the year 2036.

Forecasted Numbers of Students Lost to Attrition

Period	Statistical Models		
	Historic	**Medium**	**Contemporary**
2016-20	630,812	533,411	436,010
2021-25	631,566	481,070	330,573
2026-30	627,878	418,810	209,743
2031-36	618,389	345,953	73,518
Total	**2,508,645**	**1,779,244**	**1,049,844**

Intercultural Development Research Association, 2016.

- If we assume that the recent downward trend is real – the result of systemic changes – the attrition rate will reach single digit values in the late 2020s. By 2030, the attrition rate will be about 7 percent and it will reach zero in the year 2036. However, from now to that point, we would have lost more than 1.04 million students to attrition.

- Over the long to medium term, a more realistic model suggests that the current attrition rate will remain at 25 percent before resuming its downward trend. In this scenario, by the year 2036, attrition will be at about 11 percent, and during the period 2016 to 2036, we would have lost more than 1.77 million students.

Therefore, we should expect attrition rates in the range 22 percent to 25 percent for the next few years. We should also expect to lose between 1.05 million and 1.78 million additional students to attrition before we reach a zero attrition rate, forecasted under the most optimistic scenarios, unless this issue is considered seriously by policymakers and systemic changes implemented to ameliorate the problem.

Resources

Johnson, R. (2015). *Public School Attrition Study, 2014-15: Texas High School Attrition Rates Stall* (San Antonio, Texas: Intercultural Development Research Association). http://www.idra.org/images/stories/IDRA_Attrition_Study_2015.pdf

Montes, F. (2015). "Elusive Zero Attrition Rate at Least 20 Years Away, Despite Progress," *Public School Attrition Study, 2014-15: Texas High School Attrition Rates Stall* (San Antonio, Texas: Intercultural Development Research Association). http://www.idra.org/images/stories/IDRA_Attrition_Study_2015.pdf

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Forecasted Model Values and Residuals

School Year	Attrition Rate	Historic Model		Medium Model		Contemporary Model		Year Rate Will Be Zero
		Values	Residuals	Values	Residuals	Values	Residuals	
2008-09	31	39	8	35	4	32	1	2044
2009-10	29	36	7	33	4	31	2	2042
2010-11	27	34	7	32	5	29	2	2040
2011-12	26	33	7	30	4	27	1	2037
2012-13	25	32	7	29	4	26	1	2037
2013-14	24	31	7	28	4	25	1	2036
2014-15	24	31	7	27	3	24	0	2035
2015-16	25	30	5	26	1	22	-3	2035
2016-17	n/a	29	n/a	25	n/a	22	n/a	2036

Intercultural Development Research Association, 2016.