



The High Cost of Dropouts:

The Value of Early Warning Indicators to Identify Students at Risk



Introduction

About half of a million high school students drop out of school each year.

That's almost 1,500 dropouts a day or one every 63 seconds.

However, high school graduation is an essential milestone that has large and lasting impacts on both personal and societal wellbeing. Therefore, maximizing the number of American students who earn a high school diploma is paramount to our public and democratic health.

Personal Effects of School Attainment

Evidence suggests that a high school diploma is the ticket to future success. Greater educational attainment is associated with positive outcomes including increased job opportunities, higher likelihood of employment, and higher pay. [About 70% of jobs in the United States require a high school diploma or equivalent](#), making employment less attainable for high school dropouts. As a result, [less than half of high school dropouts](#) were participating in the workforce between 2021 and 2022, compared to over two-thirds of high school graduates who were not enrolled in college. Even when high school dropouts find employment, they earn much less than their high school and college-educated peers. In 2021 the [median annual earnings](#) for 25 to 34-year-old full time employees with a Master's degree was more than double the median annual earnings of those who had not graduated from high school.

School attainment is also associated with health outcomes. Those who complete more schooling tend to live happier, healthier, and longer lives. For instance, an [additional four years of education is associated with a lower prevalence of heart disease and diabetes](#) and on average, 25-year-old men with a bachelor's degree outlive those without a high school diploma by nearly a decade (Hummer & Hernandez, 2015). Further complicating the health-related implications, adults without a high school diploma are four times as likely to [lack health insurance](#) as those with a bachelor's degree. Associations between school attainment and mental disorders (Breslau, Lane et al., 2008) and school attainment and incarceration (Duke, 2018) have also been detected.

Societal Effects of School Attainment

Impacts related to high school graduation permeate beyond the individual. A higher graduation rate is associated with lower unemployment, higher wages, increased tax contributions, decreased demand for social services, decreased crime, and increased political participation (Belfield & Levin, 2007; Levin et al., 2007). Moretti (2007) calculated that increasing the high school completion rate of all men ages 20-60 just 1% would save the US approximately \$1.4 billion each year. Improved education could also save taxpayers billions in public assistance costs like those made available through cash, food, and housing support programs (Magnuson et al., 2007).

State Accountability for Increasing the Graduation Rate

Acknowledging the advantage that a high school diploma provides, [the Every Student Succeeds Act \(2015\)](#), requires states and local educational agencies to report adjusted cohort graduation rates (ACGR) and develop their own strategic plans for boosting them. The ACGR is calculated by dividing the sum of the number of students who earn a regular diploma in four years and the number of students with cognitive disabilities who graduate with an alternate diploma, by the number of students in the entire cohort for the graduating class. The law also requires that the ACGR be disaggregated by the following 6 subgroups:

1. Each major racial and ethnic group
2. Economically disadvantaged students
3. Children with disabilities
4. English learners
5. [Children who are homeless](#)
6. Children who are in foster care

Understanding Student Risk

Several risk-factors, including membership to some of these sub-groups, have been identified as early warning indicators for school drop-out. Status risk factors include demographic and historical aspects that are predictive of dropout but cannot be changed (Clemens et al., 2020), like qualifying for free or reduced-priced lunch, having a disability, or being an English learner (DePaoli et al., 2018). Alterable risk factors, like a students’ attendance, behavior, and course performance, are those that can be reduced through intervention strategies, including policy and/or practice changes (Clemens et al., 2020). These factors, commonly referred to as “The ABCs,” are the most predictive of high school dropout (Allensworth, 2013; Mac Iver & Messel, 2013) and are used in early warning systems to systematically predict and improve student outcomes. See Table 1 for examples of data used to predict a student’s risk level for each indicator.

Table 1 - Dropout Risk Factors Related to the ABCs

Attendance	Behavior	Course Performance
<ul style="list-style-type: none"> • Frequent tardiness • High absenteeism rates • Truancy 	<ul style="list-style-type: none"> • Behavior difficulties in school and in community • Frequent discipline referrals • Frequent suspensions or expulsion 	<ul style="list-style-type: none"> • Poor academic achievement, based on grades and scores • Over-age for grade level • Low student engagement • High rates of retention • Low credits • Low homework completion











Note: See Freeman et al., 2015.

Early warning systems can be implemented as early as kindergarten and use predictors to begin forecasting which students will be on-track to graduate high school. Well-kept systems populated with robust data that is easy to navigate and interpret can help districts identify those who are not on track for the purpose of providing targeted interventions. It is important to note however that “Early warning indicators are used only for prediction—they do not cause students to drop out. Rather, they should be treated as symptoms of the dropout process that is in progress” (Scala, 2015, p. 8). Stressful life events related to housing, money, criminal or legal issues, accidents or health problems, suspensions, pregnancy, and personal relationships amplify potential for dropout (Dupéré et al., 2018). Identifying a causal link between a single risk factor and dropping out is difficult. According to Freeman et al., 2015, “the likelihood that a student will drop out increases when multiple risk factors are present” (p. 291). Therefore, a composite of students’ risk factors should be created to inform intervention efforts.

Profiles of At-Risk Students











Much research on dropout positions it as a binary construct, grouping all dropouts in a single category to compare against graduates. More recently, researchers have acknowledged that nuances within the group exist, suggesting that students disengage with school for different reasons, their disengagement manifests in different constellations of risk-factors, and efforts to re-engage them should vary accordingly. An analysis of nearly 2,000 American students who dropped out of high school resulted in the identification of three significantly different classes or types of dropouts (Bowers & Sprott, 2012). The three student profiles below illustrate these classes.

Brian (Obviously At-Risk)

	Low	Medium	High
Attitude towards school		-	-
Test Scores		-	-
Grades		-	-
Credits		-	-
Homework		-	-
Extracurricular		-	-
Reading outside of school		-	-
Attendance		-	-
Behavior		-	-
Suspensions	-	-	











The bell signaling the beginning of class rang at least five minutes ago, and Brian slowly and reluctantly walks to his desk, which is directly in front of his math teacher's. The teacher, who is already circulating the classroom checking for last night's homework expects his tardiness at this point. Still, he greets Brian and suggests that he take out his homework before continuing with his rounds. Brian doesn't have his homework today. In fact, he hasn't completed a single assignment since school started nine weeks ago. When Jason, who sits next to Brian asks why he was late to class, Brian shoves him causing him to fall onto the tile floor. Brian knows that he'll be written up again and will likely land in in school suspension, but that might be better than sitting through another math class.

Nina (Quiet)

	Low	Medium	High
Attitude towards school	-	-	
Test Scores		-	-
Grades	-		-
Credits	-		-
Homework	-	-	
Extracurricular	-		-
Reading outside of school	-	-	
Attendance	-		-
Behavior	-	-	
Suspensions		-	-

As soon as she descends the bus steps, Nina rushes to her English teacher's classroom. She looks forward to chatting with her teacher who is also the faculty advisor of her creative writing club which meets once a week after school. Sometimes, she uses the time in between bus drop off and first bell to finish her homework. Though she emigrated from Haiti four years ago, and is now a proficient English speaker, homework that is reading-heavy continues to challenge her. This is especially true in subjects that depend heavily on technical and domain-specific vocabulary, like science. She's proud of the work she's doing in English class but is in danger of failing science, math, and history.

Kabree (Involved)

	Low	Medium	High
Attitude towards school	-	-	
Test Scores	-	-	
Grades	-	-	
Credits	-	-	
Homework	-	-	
Extracurricular	-	-	
Reading outside of school	-	-	
Attendance	-	-	
Behavior	-		-
Suspensions		-	-

Kabree has been cheering since kindergarten and this year she earned a spot as a flyer on the varsity cheer team. The team practices every day after school and cheers year-round for the football and basketball teams. She refuses to miss a day of school, unless she's too sick, because she can't attend practice if she's absent and loses next-day-game cheering eligibility. Her school requires student athletes to maintain a 2.0 grade point average to participate in athletics, but her coach requires a 3.0. With the support of her coach and teammates, Kabree maintains mostly A's and B's. A perfect storm of team interpersonal conflict, financial stressors at home, and unrelenting social media bullying causes a series of lunchroom outbursts which both led to disciplinary referrals and temporary probation from the cheer team.

Create Your Own Early Warning System

Districts can take a proactive approach to identify students, like Brian, Nina, and even Kabree, who are at-risk of dropping out by analyzing the student-level data they already collect related to the early warning indicators. However, collecting data points on multiple indicators for several hundred if not thousand students each year can quickly inundate a district making it difficult to glean meaningful insights and identify those in immediate need of intervention. For every student, districts document grades, achievement test scores, diagnostic and progress monitoring assessment scores, attendance records, discipline referrals, detentions, suspensions, demographic information, Individualized Education Plan status, English learner status, and extracurricular activity involvement. Early warning systems depend on accurate and efficient data compilation and analysis. However, student-level data is often input by different people and stored in different spreadsheets or databases, making it more challenging for districts to analyze the risk-factors in concert and create composite profiles of at-risk students.

Software may assist in organizing student-level data and automating risk-analyses for each student based on data inputs. Figure 1 displays an example of one district's early warning system that was created by a software analysis tool using the district's existing data. The system provides a score ranging from 0-2 for each indicator based on district-established thresholds. A score of 0 indicates the lowest risk and a score of 2 indicates the highest risk for each indicator. In this district, students earn a 0 for coursework or grades if they have A's, B's, and C's only. Students like Nina who have two or more D's and/or F's earn a 2 indicating a higher level of risk.

Figure 1 – District-Level Early Warning System Dashboard



With a student analytics software system, districts can easily review historic data to ensure that their established thresholds are effectively identifying dropouts and those who continuously struggle with disengagement. For instance, if a district decides to use less than 90% attendance as their metric for highest risk but then discovers that several students with 94% attendance dropped out the previous year, they can adjust the threshold to catch future dropouts more accurately.

An analysis tool can also provide a composite risk-level based on each student’s scores for the three indicators combined. For this district, the levels range from No Risk to High Risk. Students who earn 0 points across the three indicators are marked as “No Risk” whereas students who earn five or more points are marked as “High Risk.” Using this software, teachers and administrators can quickly identify those most at risk and intervene quickly. Figure 2 shows that the system classifies Kabree as low risk, but not no risk, because while her academics and attendance are on track, her recent disciplinary episodes earned her a point for behavior.

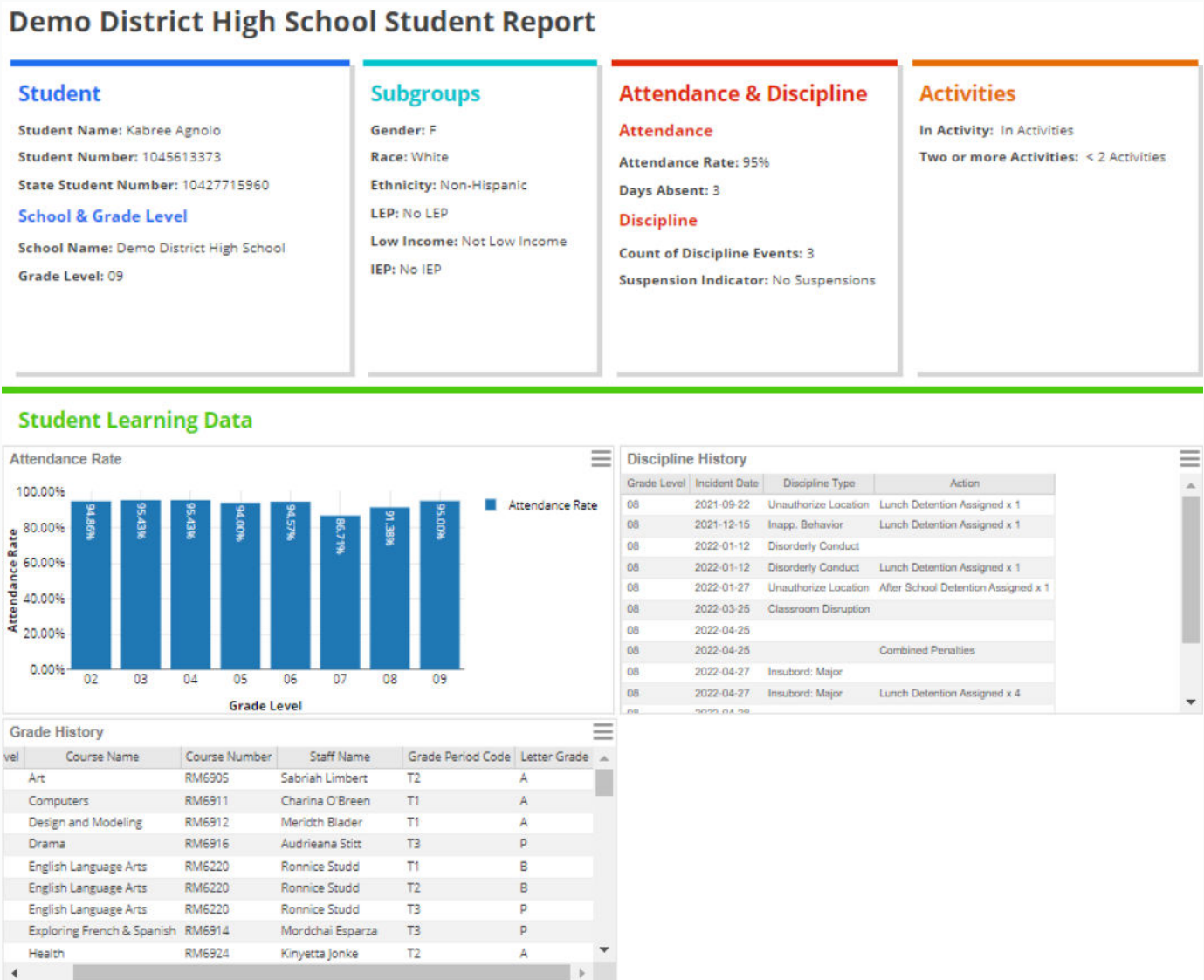
Figure 2 – Student Risk Analysis

Student Number	Student Name	School Year	School Name	Grade Level	Academic Risk Level	Attendance Risk Level	Behavior Risk Level	Risk Level
1045612566	Joe MacGilrewy	2023	Demo District High School	09	0	0	0	No Risk
1045609394	Jovante Isham	2023	Demo District High School	09	0	1	0	Low Risk
1045613484	Juarie Brayson	2023	Demo District High School	09	1	1	0	Low Risk
1045613937	Juliamarie Hellsdon	2023	Demo District High School	09	0	1	0	Low Risk
1045611226	Jynna Janning	2023	Demo District High School	09	0	0	0	No Risk
1045613373	Kabree Agnolo	2023	Demo District High School	09	0	0	1	Low Risk
1045607183	Kahlilah Artinstall	2023	Demo District High School	09	1	2	2	High Risk
1045609406	Kalila Groves	2023	Demo District High School	09	0	0	1	Low Risk
1045613403	Kamoni Wilson	2023	Demo District High School	09	1	0	2	Medium Risk
1045607566	Kariann Hedger	2023	Demo District High School	09	0	0	0	No Risk

A More Holistic View of Students

Using a comprehensive student-analytics software, teachers and administrators who want more information about a specific student, like Kabree, can easily access it by clicking on his or her name. The action will transport them to a student report page, like the one depicted in Figure 3, that presents all available data on the selected student.

Figure 3 – Student Report Page



To contextualize a student’s performance on a particular indicator, a district can zoom out to district-level data and see how the student compares to his/her peers. For instance, Figure 4 displays the student-level behavior data across an entire district.

Figure 4 – District-wide Student-level Behavior Data



The benefits associated with earning a high school diploma is well-documented and schools are poised to help students achieve this essential milestone. Districts are already doing a lion’s share of the work by collecting data on early warning indicators for each student. By taking it just one step further and adopting a software analysis tool, they can turn disparate data points into meaningful insights about those students who are on track to graduate and those who are at-risk of dropping out.

This is just one way district offices can support campuses in their work of knowing every young person by name, strength, and need. Prioritizing speed to insight around those who are struggling within the organization allows a building to focus its resources on fostering an environment more comprehensive in its’ development and nurturing of all young individuals.



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