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PRACTITIONER BRIEF

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What Can Schools, Colleges, and Youth Programs Do With Predictive Analytics?

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THE PROBLEM: HOW TO ASSESS YOUNG PEOPLE'S RISK USING MORE DATA BUT LESS TIME

A school administrator sees students struggling to pass the ninth-grade algebra exam and wants to know each student's risk of failing. She has access to students' past course histories and math assignments. She also thinks more factors may be at work, but reviewing more data feels overwhelming.

Many low-income young people are not reaching important milestones for success (for example, completing a program or graduating from school on time). But the social-service organizations and schools that serve them often struggle to identify who is at more or less risk. These institutions often either over- or underestimate risk, missing opportunities to intervene with those who need more help or inefficiently providing services to those who do not need them. Most "early warning systems" of risk rely on only a few measures, mainly because in the course of day-to-day practice, one can keep track of only so much information at a time. Yet this approach ignores a wealth of data collected for different purposes that could help programs and schools identify risk earlier and more accurately.

A SOLUTION: PREDICTIVE ANALYTICS

MDRC uses cutting-edge methods and a field-tested framework to capitalize on that wealth of data. With predictive analytics, we can:

- Rank young people by their risk levels
- Show variation in young people's risks and needs at a single point in time
- Capture changes in risk as new information is collected

To get a better sense of who is at risk of failing algebra, the administrator wants to take advantage of past course history and performance on math assignments, as well as factors such as whether a student is an English language learner, whether that student has moved frequently, and the student's attendance patterns. Since she does not have time or know how to combine and analyze those data, she needs an approach that can help while producing an easy-to-interpret result.

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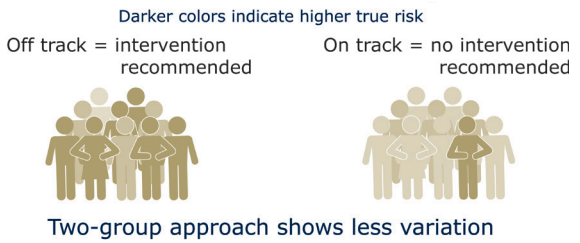
THE COMMON "INDICATORS" APPROACH	MDRC'S PREDICTIVE ANALYTICS APPROACH
 Two-group approach shows less variation	 Continuous measures show more variation
Uses a few individual-level summary measures to assess risk. For example, many organizations use the so-called ABC indicators of attendance, behavior, and course performance to understand whether a student is on track to graduate.	Can use hundreds of individual-level measures. For example, it can incorporate daily attendance and tardiness trends, screening data, case notes, and more.
Produces limited risk categories. For example "at risk/not at risk" or "low/medium/high risk."	Produces a continuous measure of risk that reveals variation in risk levels within categories.
Cannot rank which individuals are at more or less risk, can only assign them to categories.	Can rank individuals' risk levels and group them in multiple ways.
Is accurate for the average individual.	Is more accurate for young people who do not have typical risk profiles.
Uses indicators and risk estimates that are static, updated maybe once a year.	Produces risk estimates that can be updated whenever new information is available.
Is typically used to describe the risk of not reaching only one or two milestones, because the research process used to establish risk categories is complicated and subjective.	Can be used to describe the risk of not reaching multiple, successive milestones in a young person's life, because the automated process can be repeated.

THE RESULT: REAL-TIME ESTIMATES OF INDIVIDUALS' RISKS THAT CAPTURE VARIATION

MDRC can apply predictive analytics to identify risk levels for individual young people but also aggregate risk levels for sites (schools or program locations), so that institutions can better direct their resources.

> The administrator wants to see whether students who are not at risk of failing at the beginning of the ninth grade become at risk of failing six weeks into the school year. This analysis can help her understand who might need additional services and when.

Predictive analytics can answer questions such as:

- Absence: What is the likelihood that an individual will miss school or program participation more than 10 percent of the year?
- Course failure: Which students are most likely to fail a required exam in a given subject?
- Completion: Is a young person more at risk of not completing Program A or Program B?
- Variation in risk: How is the risk of not graduating on time spread among schools or centers in a district?
- Change in risk: How do young people's risks of not completing a program change during the course of a year?

WHAT IT TAKES

1. MDRC works with an organization to assess whether predictive analytics are appropriate and valuable for its goals and questions.

Are predictive analytics right for your organization? Yes, if you:

- ☐ Already assess or guess at young people's risk of not reaching certain milestones, and want to improve the accuracy of your risk assessments.
- ☐ Can implement interventions meant to help young people at risk.
- ☐ Make the most of limited resources by directing services only to those at risk.
- ☐ Believe that targeting services based on risk will increase the success of an intervention.

2. If so, we investigate how ready the organization is for predictive analytics.

Is your organization ready for predictive analytics? Yes, if you:

- ☐ Make data readily available that are updated throughout the year.
- ☐ Are ready to communicate and act on results.
- ☐ Employ a staff and a data system that can sustain predictive work.

3. MDRC works with the organization to identify which milestones we should focus on. We choose ones where there are enough good data to work with and where the risk involved is relevant to the organization's decisions about interventions.

4. For each milestone we choose with the organization, we calculate a likelihood that each individual will not reach that milestone.

5. We help the organization incorporate these results into its tracking systems. We help it prepare to sustain predictive analytics and incorporate the approach into its continuous improvement processes.

Now that the administrator knows six weeks into the school year which students are at risk of failing, she has time to talk to instructors and support staff members about student risk and provide students tutoring or other interventions before they take the final exam.

We also help organizations understand the limitations of predictive analytics. Predictive analytics can only assess risk — they do not reveal anything about the effectiveness of an intervention. But MDRC can use other rigorous methods, such as randomized field trials, to answer those questions. Our experience from evaluating dozens of youth programs as well as designing interventions informed by behavioral science can help organizations decide what to do next: how best to intervene and with whom.

For more information on predictive analytics, e-mail Rekha Balu.

ABOUT MDRC

MDRC is a nonprofit, nonpartisan social and education policy research organization dedicated to learning what works to improve the well-being of low-income people. Through its research and the active communication of its findings, MDRC seeks to enhance the effectiveness of social and education policies and programs.

Founded in 1974 and located in New York City and Oakland, California, MDRC is best known for mounting rigorous, large-scale, real-world tests of new and existing policies and programs. Its projects are a mix of demonstrations (field tests of promising new program approaches) and evaluations of ongoing government and community initiatives. MDRC's staff brings an unusual combination of research and organizational experience to its work, providing expertise on the latest in qualitative and quantitative methods and on program design, development, implementation, and management. MDRC seeks to learn not just whether a program is effective but also how and why the program's effects occur. In addition, it tries to place each project's findings in the broader context of related research — in order to build knowledge about what works across the social and education policy fields. MDRC's findings, lessons, and best practices are actively shared with a broad audience in the policy and practitioner community as well as with the general public and the media.

Over the years, MDRC has brought its unique approach to an ever-growing range of policy areas and target populations. Once known primarily for evaluations of state welfare-to-work programs, today MDRC is also studying public school reforms, employment programs for ex-offenders and people with disabilities, and programs to help low-income students succeed in college. MDRC's projects are organized into five areas:

- Promoting Family Well-Being and Children's Development
- Improving Public Education
- Raising Academic Achievement and Persistence in College
- Supporting Low-Wage Workers and Communities
- Overcoming Barriers to Employment

Working in almost every state, all of the nation's largest cities, and Canada and the United Kingdom, MDRC conducts its projects in partnership with national, state, and local governments, public school systems, community organizations, and numerous private philanthropies.