About Time:
Master Scheduling and Equity

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ABOUT CPRL

The Center for Public Research and Leadership (CPRL) at Columbia University strives to revitalize public school systems while reinventing professional education. CPRL conducts high-impact research and consulting projects for clients in the education sector and provides rigorous coursework, skills training, and real-world experiential learning for our graduate students who attend programs at Columbia University and across the country. Since our founding in 2011, CPRL has trained over 500 future leaders and provided research and consulting support to more than 150 state agencies, school districts, charter school organizations, foundations, and advocacy groups, among others.

BACKGROUND

Master schedules are used to structure time, people, resources, and space within a school. This report provides school and district leaders advice about how to use the master schedule to advance equity in their communities. It illuminates ways the schedule can both undermine and advance equity and provides a framework to help schools and districts pivot from technical to strategic scheduling to expand access and opportunity for all students.

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Introduction

Schools and districts work tirelessly to provide the best learning environments for students and to improve student outcomes. There is no singular vision of a successful school, but there are common improvement strategies: school leadership, parent and community relationships, professional capacity of the faculty, school learning climate, and instructional guidance.[1]

One vehicle for helping schools and districts grow closer to their visions is often overlooked: the master schedule.

Schools use the master schedule to choreograph the movement of people through time and space—to map out the inner workings of a school. The master schedule details and coordinates available classes, instructional time, student groupings, teacher assignments, and the physical location of classes. Master schedules affect students' educational trajectories, from their teachers and classmates to whether they take courses that align with graduation and college entry requirements to their postsecondary options and outcomes.[2] They are living structures that reflect the culture, climate, expectations, vision, and priorities of the school.

> " [T]he master schedule is how you drive reform in a school. Although people tend to think about it as a technical process, it really is the leadership process of the school. "
>
> **DEPUTY SUPERINTENDENT**

The complex and detailed nature of master schedules mean they are often overlooked as core to a district's and school's strategy. It is easy to get lost in the details of master scheduling without thinking about the choices that drive the scheduling process. They appear like operational choices at first—offer English first period, schedule in 90-minute blocks—but they can have wide-reaching consequences on students' access to opportunity and overall quality of learning. In particular, focusing on the details but not their effect often leads to reduced access and opportunity for the most marginalized, including Latino students, Black students, students experiencing poverty, students with disabilities, and multilingual learners.

In assigning students and teachers to classes, the schedule can perpetuate disparities in access to rigorous and rich coursework and experienced educators. Treated as a technical process, master scheduling formalizes inequities and makes decisions appear more objective than they are. For example, enrollment policies disproportionately exclude Black and Latino students from advanced coursework like Advanced Placement (AP) and International Baccalaureate (IB) classes, sometimes based on prerequisites that have little bearing on students' actual likelihood of success.[3] Black and Latino students are also more likely to be assigned a teacher with fewer years of experience.[4] The result is years of barriers and interrupted access to the highest-quality learning opportunities and best-fit educators.

Moving away from a technical approach to master scheduling presents an extraordinary opportunity to expand equitable access and opportunity, especially for marginalized students. When treated strategically, the master schedule can mitigate inequities and give life to district and school mission and vision statements.

Strategic scheduling allows schools and districts to:

- arrange time, resources, and people to maximize student learning and experience
- provide teachers adequate time to collaborate and refine their practice
- provide more equitable access to rigorous and rich coursework
- pair students with the best-fit educator
- improve attendance, learning, and graduation rates

> ❝ First and foremost, if one wants to know the priorities of a school, just look at their master schedule. ❞
>
> **PRINCIPAL**

This report establishes a case for strategic scheduling and a framework for helping schools and districts schedule in a way that expands rather than limits equity. Part I provides key definitions and describes the data and methods used to study the relationship between master scheduling and student access and opportunities in schools and districts nationwide. Part II discusses how the master schedule commonly undermines equity. Part III elaborates a vision of equitable scheduling and a framework that can guide application of the recommendations. Part IV closes with a discussion of how the coronavirus pandemic has created an opportunity for strategic scheduling. Included are stories of schools and districts that have already begun to use strategic scheduling practices to better serve students, families, and educators.

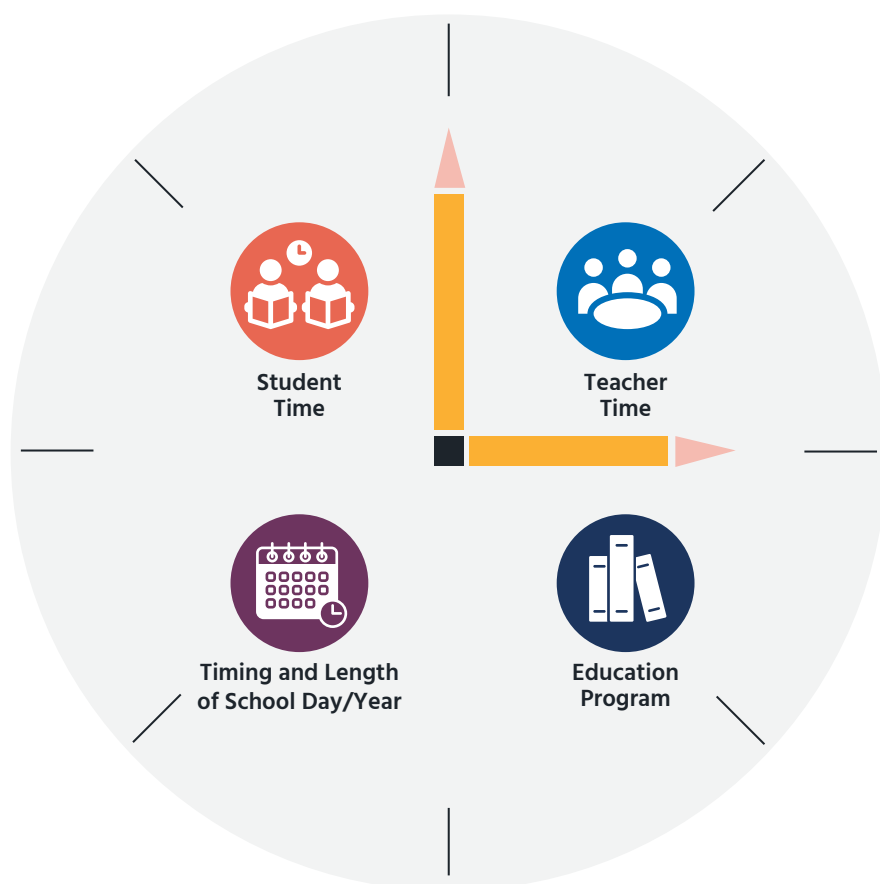| KEY TERM	DEFINITION
Access	The ability to harness and meaningfully benefit from resources and opportunities without being inhibited by barriers. In the educational context, this means delivering students the human capital, instructional, academic, social-emotional, and health and wellness resources and supports needed to succeed in school and beyond.
Equity	Redressing injustice by consciously providing and sustaining just and fair systems that respect the uniqueness of each person and afford differentiated treatment based on need.
Master Schedule	A plan for organizing students and staff during the school day. Defines the timing, sequence, location and duration of classes, and the organization of students' and staff time in school.

Part I: Background and Methods

To study the relationship between master scheduling and student access and opportunity, CPRL examined master scheduling policies, practices, and effects nationwide.

Master scheduling is the process used to organize students and staff during the school day. Through the master scheduling process, a school or a district defines the timing, sequence, location, and duration of classes; student groupings and assignments; and staff schedules.

To construct the master schedule, schools and districts must make decisions in four key areas:

- **Timing and length of the school day and year.** When will the school day start and end? When will the academic year start and end? How will the year be divided into terms? How will the week and day be divided into periods or instructional blocks? What bell schedule will schools use? In other words, how long will each period or instructional block last and be organized (e.g., rotating, traditional)?

- **Education program.** What courses will be available? What learning pathways?

- **Student time.** Which classes will students be assigned to? How will students be grouped and placed?

- **Teacher time.** Which classes and students will teachers teach? When will teachers have time to prepare and collaborate with others?

FIGURE 1:
Master schedules influence student and teacher time, the timing and length of the school day and year, and the educational program.

STUDENTS	PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4	PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4
	8:35-10:05	10:15-11:45	11:55-1:30	2:10-3:40	8:35-10:05	10:15-11:45	11:55-1:30	2:10-3:40
9th Cohort A	IM 1/AVID (Teacher L)	Biology (Teacher G)	PE	Eng 1,2/AVID (English X)	IM 1/AVID (Teacher L)	Green Up 'n Go (Teacher G)	PE	Eng 1,2/AVID (English X)
9th Cohort B	PE	IM 1/AVID (Teacher L)	Eng 1,2/AVID (Teacher A)	Biology (Teacher G)	PE	IM 1/AVID (Teacher L)	Eng 1,2/AVID (Teacher A)	Green Up 'n Go (Teacher G)
9th Cohort C	Biology (Teacher G)	Eng 1,2/AVID (Teacher A)	PE	IM 1/AVID (Teacher L)	Green Up 'n Go (Teacher G)	Eng 1,2/AVID (Teacher A)	PE	IM 1/AVID (Teacher L)
10th Cohort A	IM 2/AVID (Teacher M)	Eng 3,4/Public Spk. (English Y)	Elective	Physics-Adv/Regular (Teacher F)	IM 2/AVID (Teacher M)	Eng 3,4/Public Spk. (English Y)	W. Hist (Teacher E)	Constr. Tech (Teacher J)
10th Cohort B	Eng 3,4/Public Spk. (Teacher B)	Physics-Adv/Regular (Teacher F)	IM 2/AVID (Teacher M)	Elective	Eng 3,4/Public Spk. (Teacher B)	Constr. Tech (Teacher J)	IM 2/AVID (Teacher M)	W. Hist (Teacher E)
10th Cohort C	Eng 3,4/Public Spk. (English Y)	IED (Teacher K)	Physics-Adv/Regular (Teacher F)	IM 2/AVID (Teacher M)	Eng 3,4/Public Spk. (English Y)	W. Hist (Teacher E)	Elective	IM 2/AVID (Teacher M)
11th Cohort A	Am Lit/AVID (Teacher C)	Fine Woodwork. (Teacher J)	IM 3	Chem- H/Regular (Teacher H)	Am Lit/AVID (Teacher C)	US Hist- H/Regular (History X) *Period is Flexible*	Stats/Elective	Elective
11th Cohort B	Fine Woodwork. (Teacher J)	Chem- H/Regular (Teacher H)	IM 3	AP Lang/AVID (Teacher A)	Elective	US Hist- H/Regular (Teacher D)	PreCal/Elective	AP Lang/AVID (Teacher A)
11th Cohort C	Chem- H/Regular (Teacher H)	Elective	IM 3 Adv	Am Lit/AVID (Teacher C)	US Hist-H/Regular (Teacher D)	CEA 1,2 (Teacher K)	H.PreCal/Elective	Am Lit/AVID (Teacher C)
12th Cohort A	Govt/Econ (Teacher D)	AP Eng Lit/Writer's (Teacher C)	Elective/Math	Elective/Math	UCCI (Teacher J)	AP Eng Lit/Writer's (Teacher C)	Elective/Math	Elective/Math
12th Cohort B	CEA 3,4 (Hon Architecture) *Could be P3*	Govt/Econ (Teacher D)	Elective/Math	ERWC/Writer's (Teacher B)	Elective/Math	Elective/Math	Elective/Math	ERWC/Writer's (Teacher B)
12th Cohort C	Elective/Math	ERWC/Writer's (Teacher B) *MIXED*	Govt/Econ *MIXED* *Period is Flexible*	"UCCI (Teacher J)"	Elective/Math	"ERWC/Writer's (Teacher B)*-MIXED*"	Elective/Math	Elective/Math

FIGURE 2: Master schedule draft for the Sustainable Academy of Building & Engineering at Herbert Hoover High in San Diego. The schedule lays out the number of student cohorts and the courses and teacher to which those students will be assigned for Grade 9 to Grade 12 (each grade and cohort appear in a different color). The schedule's top two rows list each class period and their duration.

School districts and schools at all levels—elementary, middle, and high schools—use master schedules to coordinate time and people and allocate limited resources. Typically, master schedules at the secondary school level are far more complex than those at the elementary level, given departmentalization, the increased role of student choice in selecting courses, greater variety in academic programming, and graduation requirements. As illustrated in Figure 2, master schedules detail the sequence and duration of classes, course offerings, how students will be grouped, and the person assigned to teach them.

Typically, master scheduling begins with a planning process during which those responsible for scheduling set out a timeline and actions and assign responsibilities for completing the process.[5] The planning process may also involve a review of the previous year's schedule and identification of adjustments to the bell schedule, course catalog, or curriculum. At the secondary level, the planning phase is followed by soliciting requests from students and preferences from teachers and determining the number of sections to provide for each course based on a tally of student requests.

Depending on district timelines, budget allocations may be released at this point, giving schools information about the staff they will have available to meet student requests. The next step involves building a draft of the master schedule. During this portion of scheduling, schools put everything into place: class times, prep times, room assignments, teacher schedules, and student assignments. After creating the schedule, schools refine and edit the schedule to resolve any conflicts and adjust for enrollment and staffing changes. Once the schedule is final, schools will share schedules with students, staff, and families. Revisions may continue once the school year begins.

Study design

CPRL organized its study of master scheduling around three overarching research questions:

1. How can master schedules undermine equity or advance it?

2. Which systems, tools, and processes help schools and districts effectively create, assess, and improve a master schedule that maximizes equitable access to key courses, programs of study, and other resources?

3. How has COVID-19 altered master scheduling, and what did it reveal about the underlying cause of inequitable scheduling?

To answer these questions, CPRL conducted a systematic review of the literature related to master scheduling, analyzed the legal and policy frameworks that shape master scheduling processes, and interviewed and surveyed researchers, district and school leaders, teachers, schedulers and programmers, service providers, and community-based organizations.

Systematic review of literature and legal and policy landscape

CPRL conducted a systematic review of the literature to examine the relationship between master scheduling and equity. CPRL reviewed more than 150 peer-reviewed articles, books, and media pieces (e.g., blogs, webinars) published after 2010. To locate these articles, CPRL searched the Columbia University Libraries online database with the terms "master scheduling" and "school scheduling." CPRL also sourced articles through Google Scholar and located non-peer-reviewed publications through Google. CPRL also found publications by reviewing relevant citations from the initial scan and through recommendations shared in interviews.

The research was tagged and organized under five categories drawn from the research questions: (1) master scheduling impact, (2) master scheduling process, (3) legislation and regulation influencing the master schedule, (4) effect of external shocks on the master schedule, and (5) case studies of districts' and schools' master scheduling practices.

CPRL supplemented this systematic review with a landscape analysis of the tools and resources available to support the master scheduling process. CPRL identified 29 student information systems (SISs) and scheduling software, studied their websites and user reviews, and evaluated articles for their user experience and efficacy.

CPRL also studied the legal and policy frameworks that guide and constrain the master scheduling process. CPRL reviewed federal, state, and local statutes, rules, and regulations; reviewed collective bargaining agreements; and consulted policies related to scheduling (e.g., school start times, disability law, curriculum offerings).

Finally, CPRL supplemented its initial systematic review with due diligence of ideas raised during empirical data collection. This second wave of desktop research surfaced additional ways master scheduling might be linked to equity.

Empirical data collection

CPRL conducted semi-structured interviews with a purposive sample of 36 district, charter management organization (CMO), and school leaders; instructional and noninstructional staff members; schedulers and programmers; leaders of community-based nonprofit organizations; researchers; and scheduling service providers. Participants represented 19 schools in nine states. CPRL identified an initial set of researchers, district leaders, and school leaders who could speak to the role of master scheduling in schools. CPRL then used a snowball sampling method to identify additional participants. In each interview, CPRL asked for referrals based on participants' professional judgment about which schools and districts have successfully leveraged the master schedule to increase equity.

Participants represent the following schedule-specific roles:

- teachers (special and general education teachers)

- researchers and consultants (university professors and individuals who specialize in school scheduling)

- central office leaders (superintendents, assistant superintendents, and other central office leadership involved in scheduling)

- school leaders (principals, vice principals, and deans)

- service providers (organizations that offer an SIS and/or scheduling software)

- Community-based organizations (nonprofit organizations that partner with schools to offer services during the school day)

- Schedulers and programmers (staff members who build and upload the schedule using tools or software)

ROLE	NUMBER OF INTERVIEWS
Teachers	4
Researchers and consultants	4
Central office leaders	7
School leaders	12
Service providers	5
Community-based organizations	1
Scheduler/Programmer[6]	6

Each participant was interviewed for one hour about their approach to master scheduling, focusing on its role in limiting or advancing equitable student learning. CPRL recorded the audio of each interview, which was then transcribed.

CPRL also surveyed SIS and scheduling software providers about their functionality. The list of providers was narrowed to include only those that provided the ability to build a master schedule.

Scheduling providers and tools that only analyzed data or that exclusively provided consulting support were excluded from the survey. Twenty-five service providers were invited to participate; eight completed the survey.

Finally, CPRL identified three sites for in-depth case studies, supplementing interview findings with artifacts, publicly available data, school board minutes, and local media coverage.

Analytic approach

To respond to the first research question, CPRL defined a set of codes that revealed master scheduling activities that undermine and advance equity, links between master scheduling and access to high-quality education, links between master scheduling and student outcomes, and the role the legal and policy context play in defining and constraining the master scheduling process. CPRL coded all primary and secondary data, analyzed coded data, and identified descriptive themes, trends, and notable outliers. Particular attention was paid to the processes and tools that participants perceived to be effective. The findings can be found in Parts II and III.

To respond to the second research question, CPRL compared coded examples of how master scheduling advanced equity with examples of when it did not. It analyzed coded data to look for patterns and divergence in resources used, steps taken, roles and assigned responsibilities, school and district context, legal and

policy frameworks, and other areas. CPRL also evaluated the evidence on service provider user experience, equity orientation, and efficacy and conducted two analytic case studies of a school (Herbert Hoover High School) and a district (Bibb County Public School District) that have emphasized using the schedule to increase equitable access to high-quality education. The findings can be found in Part III.

To respond to the third research question, CPRL identified a set of codes related to the pandemic response and applied the codes to all collected data, analyzed coded data, identified themes and notable outliers, and compared these results with the equity practices identified in response to the second research question. The findings can be found in Part IV.

Part II: Master Scheduling and Inequity

Master scheduling undermines equity when it is treated as a technical, compliance-oriented process that—in the face of countless rules, constraints, and demands from system leaders, educators, and a handful of parents—focuses first on the question, "How do we make it all work?" rather than, "How do we make the schedule equitable for all students?"

The master scheduling "puzzle:"[7] Compliance with a complex bureaucratic system

The master schedule is a captive of bureaucracy. Instead of a dedicated effort to creatively design a learning environment that maximizes students' learning and experiences, it often becomes a game of bureaucratic Whack-a-Mole, in which the schedule is built around any number of generic parameters and constraints. Myriad rules and policies "drive what is and isn't possible" in the master schedule.[8] In some instances, schedulers must balance the schedule around teachers' prep times, ensuring they have no more and no fewer than the contractual requirement and never too many in a row.[9] State mandates around coursework can also affect the schedule, sending schedulers scrambling to rearrange classroom space and teaching assignments so students can fulfill graduation requirements.[10]

The list goes on: recess mandates,[11] prescribed dates for the beginning and end of the school year,[12] staggered bus schedules,[13] graduation requirements, physical education requirements,[14] minimum instructional minutes,[15] the percentage of students with individualized education programs (IEPs) who can be in class together.[16] The architects of the master schedule must become familiar with and build a schedule that comports with each one. There is nothing inherently inequitable about the rules themselves. Recess is important. Teachers should have realistic workloads. But the cumulative number of policies informing the shape of the schedule make it challenging to use the specific needs of the student population as the starting point and key driver of the master schedule. Schedulers easily become agents of compliance—reflexively integrating all the regulatory and contractual requirements regardless of their suitability for their school community.

In the face of these demands, master scheduling is a "super complex" and often dreaded process.[16] One scheduler reports getting "stuck' with the "terrible job" of scheduling which he "wouldn't wish on [his] worst enemy." [17] It is also time-consuming,[18] taking one scheduler multiple weeks of "pretty much nonstop work" totaling over 100 hours.[19] And in some instances, it is still done with basic tools—like pencil and paper—and limited support:

> In the first few years, it was a lot of guess and check. I had pieces of paper with columns, and teachers' schedules and students' schedules and penciling and erasing and shuffling things around to make them fit. Over the years I developed an optimization process where I could, before I actually built the schedule, map out the number of periods of classes on each day and balance that out first. That took quite a few years to figure out. And that has allowed me to make the schedules a lot more sophisticated and more complicated, and build in more of that flexibility and more of those choices. [21]

Many describe master scheduling as a "puzzle" made even more challenging by limited resources and innumerable "moving pieces."[22] This perception of master scheduling can't be ignored when considering its relation to equity. Viewing the master schedule as a dreaded, complicated chore overshadows its true potential as a strategic lever for change. Too often the administrative slough of the master scheduling process occludes what could be an immense opportunity to create equitable learning environments.

Effects of scheduling inequity

The sheer volume of parameters can preclude the design of other, more tailored scheduling configurations. The master schedule, an undoubtedly strategic tool, gets treated as a logistical one. This has disastrous consequences for students because it (1) masks the true weight of the choices at hand and (2) limits what is possible.

Choices that have a significant effect on student learning—the quality of their teacher, curriculum, their exposure to diverse classmates, their exposure to grade-appropriate materials—are cast as operational and are often underanalyzed, underinterrogated, and exempt from more intentional design. This sets the stage for even the most well-intentioned schools and leaders to entrench, rather than diminish, systemic inequities.

Compliance with bureaucratic rules gives the appearance of order, but it also provides cover for the ways the master schedule sustains and reproduces the unequal and inequitable allocation of benefits and burdens that mar other aspects of U.S. public education.

For example, master scheduling can continue or create disparities in accessing a number of opportunities.
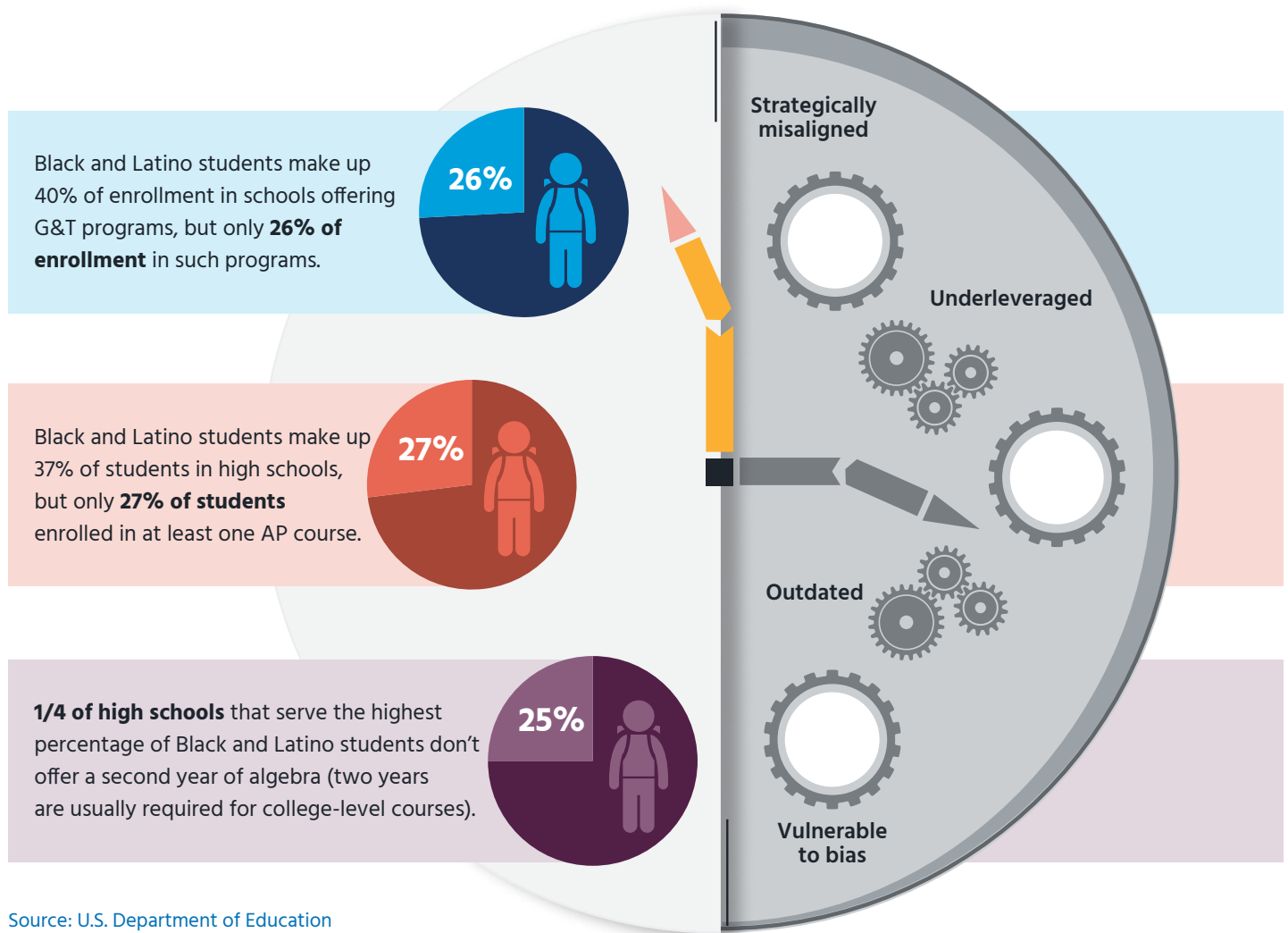
Rich and rigorous coursework

During the master scheduling process, traditionally marginalized students are at increased risk of being slotted into "junk" courses that do not set students up for postsecondary success.[23] These courses may meet high school graduation requirements but leave students underprepared for postsecondary options, including college.[24] For example, one district's audit of their available offerings revealed that students were going through high school without taking courses that met college admissions requirements:

> [Let's say] you were going to take Unifying Algebra l. Well, if you took that course, you weren't going to [be prepared for] college. That was not a [course that met college entry requirements]. When I ran all the rosters for Unifying Algebra, it was—no surprise—dominated by boys, dominated by students of color, dominated by special education [students].[25]

Leaving individual students to navigate a bloated course catalog can set them up to inadvertently select courses that do not align with or prepare them for postsecondary plans. This can disproportionately affect marginalized students who are more likely to be placed in less rigorous, low-level, and noncore courses.[26]

Black and Latino students make up 40% of enrollment in schools offering G&T programs, but only **26% of enrollment** in such programs.

26%

Black and Latino students make up 37% of students in high schools, but only **27% of students** enrolled in at least one AP course.

27%

1/4 of high schools that serve the highest percentage of Black and Latino students don't offer a second year of algebra (two years are usually required for college-level courses).

25%

Strategically misaligned

Underleveraged

Outdated

Vulnerable to bias

Source: U.S. Department of Education
Office for Civil Rights

INEQUITABLE ACCESS TO ADVANCED COURSES

There are many well-documented examples of marginalized students being denied access to rich and rigorous learning opportunities. For example, take college acceleration programs like Advanced Placement (AP) courses and dual-enrollment programs. The largest and fastest-growing college acceleration program, AP has been linked to higher rates of college acceptance and increased likelihood of college graduation.[36] Similarly, students who participate in dual-enrollment programs are more likely to attend and complete college and to have higher college GPAs.[37] Yet wide racial gaps in enrollment mean many students are missing out on these benefits. Black, Latino, low-income, and American Indian students are all underrepresented in AP programs.[38]

Although Black and Latino students are less likely than white students to attend a school that does not offer AP courses, the most significant source of AP enrollment disparity is in schools where AP courses are available; Black and Latino students enroll in them at much smaller rates.[39] A key issue, then, is not simply the availability of advanced coursework but its accessibility—specifically, the ability for students to enroll in the most rigorous courses offered at their school. Organizing enrollment is a key component of the master scheduling process, which includes everything from finalizing course offerings to gathering student course requests, deciding on the number of course sections, and assigning students to classes.

When scheduling, schools may rely on narrow and limited measures of a student's readiness for AP, leaving large swaths of students shut out of advanced coursework based on indicators that are not predictive of their actual likelihood of success in the course.[40] Using PSAT scores as a measure of student's readiness, the College Board found that Black, Latino, and American Indian students who showed the potential to be successful in math and science AP courses were nevertheless excluded from them.[41]

These divisions start long before high school, which is when most students have the opportunity to enroll in AP or dual-enrollment programs. Indeed, one of the biggest factors in whether a student participates in college acceleration in high school is whether they are on an advanced track in earlier grades.[42] Yet even before high school, marginalized students are disproportionately placed on lower academic tracks and excluded from gifted and enrichment programs.[43] And those Black and Latino students who are on accelerated tracks in elementary and middle school are less likely to be assigned to them in the transition to high school.[44]

> " Sometimes tracking happens because you create these classes and you think that they're there to support students. And what ends up happening is that you have all the students who have learning difficulties in one place, no strong peer models, the curriculum is a bit watered down, and it's really not achieving any of the goals that you're looking for it to achieve. "
>
> **ASSISTANT SUPERINTENDENT**

Desegregated learning environments

Master schedules sort students into classes in a way that can result in segregated learning environments.[27] Segregation arises from prerequisites or requirements for accessing certain coursework that disproportionately burden and exclude marginalized students.[28] At other times, master scheduling prioritizes requests made by well-resourced parents (e.g., for particular teachers or course sequences), effectively shutting out other students and creating a privileged enclave within the school.[29] In other cases, the schedule serves as a vehicle to intentionally separate students—using course codes and descriptions to signal whether a student is for Black or white students.[30] The consequences of segregation can stigmatize students, making them feel inferior while providing them with inferior education.[31]

> **One of the African American teachers who was in my department, she said, 'You watch. The master schedule is used to separate kids in this school. Watch it.' I was a teacher, and I saw my regular classes were predominantly Black, my honors were predominantly white. I went on to teach an AP class, predominantly white.**
>
> **DISTRICT LEADER**

Experienced educators best positioned to meet students' learning needs

The master schedule formalizes not just what courses students take but also from whom they receive instruction. When educator preferences drive decisions about teacher assignments, experienced teachers may opt to teach more advanced coursework, leaving newer and less prepared teachers to teach classes where students have the most academic needs.[32] This hurts students and contributes to higher teacher turnover, creating a cycle in which students in the lower academic tracks are more vulnerable to instructor instability.[33,34] In the worst-case scenario, certified teachers are paired with higher-level classes and uncertified teachers are assigned to lower-tracked classes.[35]

> "The connection to equity is statistical that your stronger teachers with more experience tend to be with our higher income, mostly white populations. And where we have our more novice teachers who have a harder time with classroom management, planning a day and running a day, we're more likely to have that kind of young new teacher turnover in our schools that are serving predominantly students of color." **CMO LEADER**

Part III: Master Scheduling and Equity

> **"** There are so many opportunities within a master schedule that can structurally and systematically create options for kids. And can put them in positions where they may never have had opportunities before their experiences at a school or within the school system. That's something that as, adults and educators, we can control. **"**
>
> **PRINCIPAL**

The master schedule is as capable of expanding access and opportunity as it is of limiting it. Schools and districts have significant influence over many scheduling policies and practices. Indeed, study participants were successfully able to leverage their master schedules to:

1. Arrange time, resources, and people to maximize student learning and experience.

2. Provide teachers adequate time to collaborate and refine their practice.

3. Provide more equitable access to rigorous and rich coursework.

4. Pair students with the best-fit educator.

5. Improve attendance, learning, and graduation rates.

These educators, schools, and districts all shared a set of enabling conditions and a set of shared practices that allowed them to shift from technical to strategic decision-making, and they all worked in three similar phases of work.

Enabling conditions

Three enabling conditions allowed educators, schools, and districts to shift from technical scheduling to strategic scheduling in order to advance equity. All had an explicit equity commitment and used data and tools that allowed them to act on that commitment.

Equity commitment

Educators', schools', and districts' use of strategic scheduling to advance equity began with an explicit equity commitment. The commitment was documented in school and district strategic plans, named as a priority by the scheduling team, and served as the impetus for revising the schedule.

This commitment was apparent in underlying beliefs that drove the actions of school and district leaders. Schools and districts all shared a "structural instinct," treating disparities as features of a system rather than evidence of deficiencies within individual students.[45] The belief that all students are capable of learning motivated teams to take a systems approach to advocate for the fair treatment of all students.

For example, when leaders in the San Diego Unified School District (SDUSD) uncovered that high school students—particularly marginalized students—were being scheduled into "junk" courses that did not count toward college coursework requirements, the district adjusted the entire policy for approving courses in the course catalog; nothing could be added that did not fulfill University of California A–G requirements.[46] They did so despite fears that "failure rates [were] going to go through the roof."[47] The benefit was observed almost "overnight" with increasing numbers of Black and Latino students enrolling in A–G courses than had previously had access and succeeding in them.[48] One former district leader remarked on the change:

> "Honestly, it was because we let the kids in. It wasn't because we changed the instruction. It was because we actually let the kids in the courses. And guess what? When our expectations went up, the kids' expectations of themselves went up.… It was never about the fact that they couldn't do it. It was that teachers didn't think they could, and therefore that became that belief."[49]

The commitment to equity was also demonstrated by the intentional and continued efforts to seek out and address the "hidden" conditions that maintained privilege, including evidence of bias. These schools and districts made intentional choices to investigate the disparate effects of policies and practices on marginalized students. They explicitly searched for access gaps and worked to advance solutions to address disparities, including by building the capacity of school-based staff to recognize the impact that seemingly neutral scheduling practices could have on limiting student access and opportunities.[50]

Data and tools

Educators, schools, and systems that used strategic scheduling to advance equity had access to data to inform their decisions and tools to design and evaluate their scheduling processes. They took advantage of student performance and school culture data, as well as information from master scheduling and equity audits, that was designed to uncover the impact of scheduling on staff and students. These audits looked closely at school transcripts and schedules, demographic balances within academies, courses and classes, and the timing of intervention and instructional blocks to uncover patterns within schools in the district.

In Bibb County School District, a district of about 22,000 students in Macon, Georgia,[51] master scheduling audits let school leaders observe the full scope of what they anecdotally knew was taking place in elementary classrooms: Students were receiving different amounts of instruction and intervention.[52] Teachers

might skip writing or science instruction for days, leaving some students without access to grade-level content and opportunities to practice.[53]

The most successful schools and systems also used tools that let them rectify inequities in compliance with rules and regulations. But this was not true at the outset. In every case, the shift from technical to strategic scheduling was accompanied by a shift from limited to more sophisticated tools. As schools and systems sought to do more with their schedules, they stumbled over difficult-to-use tools and were pushed to find alternatives.[54]

These schools and systems worked with a number of providers, whose services include hosting district-wide equity-focused trainings and convenings, providing on-demand consulting and technical support, and conducting district-wide data collection and analysis. (For a full list of providers and an analysis of their features, see Appendix A.)

In addition to more advanced technology, providers offered training over several days on the technical aspects of the software as well as the mindset and relational capacity that changing the schedule would require.[55] Representatives were available for ongoing support throughout the scheduling process to do a range of tasks, from presenting data at board meetings to troubleshooting and building scheduling scenarios.

In the process, schools found that many available scheduling tools and SIS lacked five key functions, which they sought in replacements:

1. Data reporting
2. Intelligent error detection
3. Customization options
4. Intuitive design
5. Compatibility with multiple and complex scheduling scenarios

Each of these key functions is discussed in greater detail in the following section.
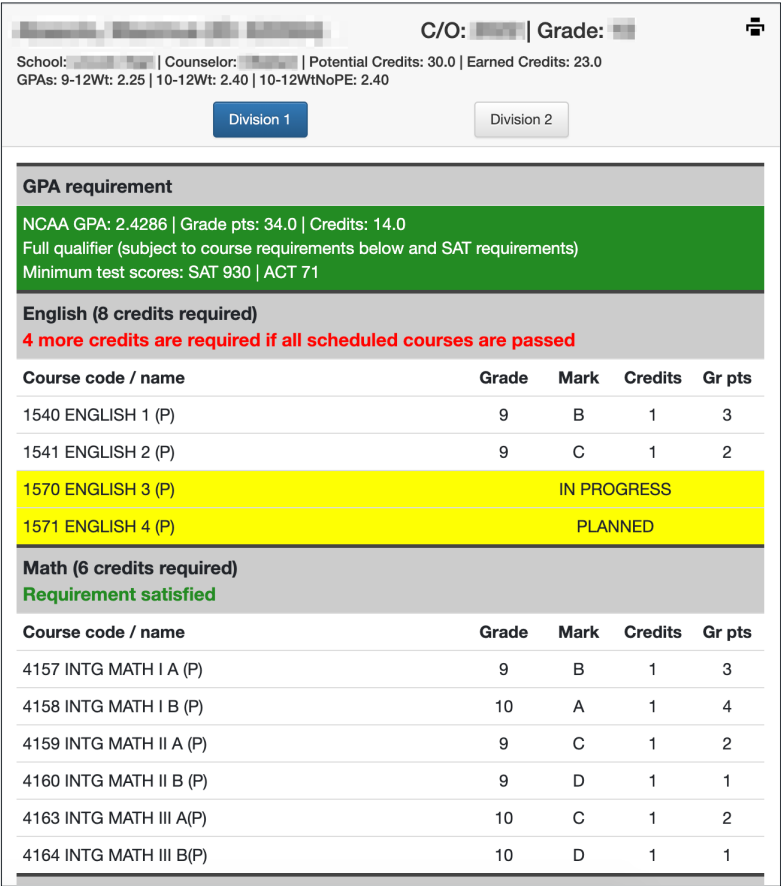
Data reporting

Schools and districts relied on auditing and data-reporting tools to analyze and improve schedules. In San Diego, without effective tools, the auditing process took days and involved highlighting printed transcripts and schedules. But with the advent of two custom-built scheduling tools (Mindset and Online Student Profile System, or OSPS), "what would take hours took seconds."[56] Schools could easily access reports on whether a student was scheduled in a class they'd already taken.[43] Districts could look at performance and enrollment patterns by demographic groups across all schools. Counselors, who once had to rifle through hundreds of printed pages to perform a credit check for one student, could now easily access the information on a computer and even customize requirements, for example to monitor a student's credits and GPA against NCAA requirements for participating in sports (Figure 4).[57]

Herbert Hoover High School (Hoover High), which serves about 2700 students, one of the first schools in the San Diego Unified School District to use Abl, a scheduling software provider with an "operational approach to access and equity"[58] was able to collect and visualize even more data. The Sankey Diagram below was used to help school leaders understand how well they achieved their goal to create small learning communities with a reduced number of unique peer-to-peer interactions to foster a sense of community and belonging. The Sankey Diagram illustrates the movement of students throughout a day. The left of the diagram represents the start of the school day, and the right represents the end. Reading from left to right, the diagram shows how students move throughout the day from period to period. The gray lines represent students. The thicker the line, the greater the number of students moving together from class to class. By contrast, thin lines represent a single or small group of students. These thin lines are labeled with the courses that a student or a small group of students is taking that causes them to break from the cohort.

In Grade 9 (Figure 5) the diagram showed fewer, thicker lines. Students traveled with their cohorts for most of the day. But in Grade 11 (Figure 6), there are hardly any thick lines. Changes Students are not moving within a few, well-defined cohorts. Students enrolled in AP, honors, and dual-enrollment make up most of the outliers. On the other hand, students who are not enrolled in advanced or college acceleration classes remain grouped together (Figure 6). This information helped Hoover High measure the effectiveness of its wall-to-wall academy model, which was intended to create small, family-like environments within each academy.

FIGURE 4

View of student profile in OSPS. Along the top is credit information. Color-coding is used to indicate whether a student has completed (green), has not completed (red), or is in the process of completing (yellow) a particular requirement.

FIGURE 5

The Sankey Diagram is used to illustrate the movement of students throughout a day. Hoover High School has five academies, and this diagram shows how ninth grade students are consistently grouped or "cohorted" within one of them—The Academy of Health and Healtheir Communities. The left of the diagram represents the start of the school day, and the right represents the end. Reading from left to right, the diagram shows how students move throughout the day from period to period. The grey lines represent students. The thicker the line, the greater the number of students moving together from class to class. The prevalence of thicker lines show that the academy model creates a low number of unique peer-to-peer interactions in keeping with Hoover's goal to foster a sense of community and belonging through small, linked-learning communities.

- The red loops indicate courses that stay the same across day types.
- Thick bands represent a consistent cohort of students, moving together from section to section.
- Thin bands are single or small groups of students. The course names show the sections those outlier students are enrolled in.

FIGURE 6

Cohorts are less defined among this group of students. Outlier courses are mostly dual-enrollment college courses, AP courses, or honors courses.

Intelligent error detection

Without effective tools, schools relied on human reviewers of the schedule to find and report errors. Sometimes this meant that students did not receive their appropriate set of classes until months into the school year, unnecessarily delaying their access to credit-bearing coursework and forcing them to learn the same amount of material in less time.[59]

Customization options

Effective tools enabled schools and districts to receive automated errors within the scheduling platform, but they also allowed for schools and districts to enter custom parameters. In Bibb County, where the district now requires specific instructional minutes for each subject, Dr. Cami Hamlin, principal of Springdale Elementary School, can pre-enter the time requirements into the scheduling software. Previously, without the ability to pre-program parameters, Dr. Hamlin would find herself planning for fewer instructional minutes to make the schedule work.[60]

Intuitive design

A smooth user experience was also noted as a welcome departure from "clunky" and "archaic" scheduling systems, which slowed and complicated the process.[61] Before her district started using scheduling software from District Management Group (DMGroup), an organization that supports districts in making systems-level change that improves students' academic and performance outcomes,[62] Dr. Hamlin engaged in a time-intensive manual scheduling process, which involved "lots of paper" and "cutting and pasting."[63] Since switching to a more effective tool, Dr. Hamlin spends much less time focusing on the mechanics, and she is able to tailor the schedule so it works for students who need the most support:

> It's not time intensive anymore. If you have your priorities and you know which group of kids needs the most support to…level the playing field, then it's easy to snap, snap, snap—put it in there... So the big work is identifying the kids and getting them the right services and supports.[64]

Compatibility with multiple and complex scheduling scenarios

During the coronavirus pandemic, schools commonly created multiple schedules within a single year. Even before that, schools benefited from tools capable of creating multiple scheduling scenarios or handling complex schedules. In some instances, schools might have staff members available for only a portion of the school day.[65] In others, they would need to plan for interventionists, who were scheduled for blocks within a period but not a full period.[66] The rotating cycle of specials could also create complexity.[67] With an effective tool, schools could easily manipulate the schedule and view and print schedules by role.[68]

Scheduling phases

With these enabling conditions in place, educators, schools, and systems that used strategic scheduling began scheduling up to a year or more in advance and organized the scheduling process into three overlapping phases:

- **Phase I: Action Planning:** This phase typically began in the summer or early fall and lasted one to two months. This phase was shorter when a scheduling team was already in place and longer for schools that were shifting to team scheduling for the first time. In this phase, a scheduling team assembled, making plans for the work ahead and outlining an action plan (assigning roles, responsibilities, timelines) for the upcoming scheduling cycle.

> " [W]hen you're…a school administrator, thinking about next year in September is really hard. You've just gotten things started, kids are just getting to their classes, and I'm asking you to start thinking about how you're going to be ready for this time next year. Finding the space and the time to develop that kind of timeline in the busyness of day-to-day school administration is a challenge. And that's why we really emphasize it. "
>
> **DEPUTY SUPERINTENDENT**

- **Phase II: Data Review and Priority Setting:** This phase typically began in midfall and lasted one to two months. In this phase, the scheduling team deepened its understanding of the schedule's impact by collecting and analyzing multiple sources of data, including qualitative conversations with students and staff, with a specific focus on ways the schedule limits equitable access and opportunities to rich and rigorous learning opportunities, effective instruction, and intervention. The scheduling team also generated and acted on ideas for improving the schedule, articulating a set of priorities to drive decisions in the upcoming phase.

- **Phase III: Schedule Generation and Feedback:** This phase typically began in early to midwinter and lasted three to six months, given that schools typically made adjustments to the schedule over the summer months. The team received course requests and generated the master schedule, organizing time, students, and staff in accordance with the lessons and priorities from Phase II, and doing so with enough time to invite feedback and make revisions before school began.

For example, in Bibb County School District, Phase I began with the assembly of a core scheduling team consisting of school administrators, members of the teaching and learning team, the special education team, and the English Speakers of Other Languages (ESOL) team. The team came together to address apparent discontinuity in school quality throughout the district. (See Appendix C for the full case study.) About the process, one district leader said:

> When I first came on board, scheduling was left up to the schools individually. What we ended up seeing is some disparities across the line from the elementary, middle, and high school levels…. So schools were kind of their own little systems. We were systems of several systems. And so contingent upon what school your child went to, your child may have had a more rigorous experience than another school, and your child may have been afforded more opportunities to take AP courses than another school. That lack of continuity was not good for us…our students move continually throughout the district…They could get a totally different learning experience based on scheduling.[69]

The team communicated the process with other district leaders and teachers, as well as the board of education, and brought in a third party, DMGroup, for support.

In Phase II the core team collaborated with DMGroup to conduct a district-wide diagnostic of scheduling practices. DMGroup met with teachers and paraprofessoinals and administered a survey in which teacers across the district spent a week recording how they spent their time.[70]

The data collection refined the core team's understanding of the effect of the schedule in schools across the district and allowed them to set priorities for the schedule based on what they learned. Specifically, the district set out to establish:

- common guidelines for instructional time in elementary schools across the district
- time for common planning in each school
- dedicated time for enrichment and intervention
- a collaborative scheduling process across the district

In Phase III, the district provided additional guidance for building the schedule in line with common priorities. Schools were provided guidelines for the length of each instructional block (Figure 7), guidance on when pullout for intervention could take

place (Figure 8), a sample master schedule (Figure 9), and additional guidance on staggering blocks, and scheduling collaboration time. Each school was then responsible for producing its own schedule.

At the school level, principals followed a similar process to create their school schedules. At Springdale Elementary, Dr. Hamlin also began by assembling her scheduling team, which consists of the school's special education leads, a teacher leader and programmer, the assistant principal, counselors, ESOL staff, and Early Intervention Program members. The team engaged in a SWOT analysis, using data to surface strengths, weaknesses, opportunities, and threats related to the previous year's schedule. Particular attention was given to understanding the efficacy of interventions for each student and developing priorities for providing and scheduling services in the coming year. The team also analyzed grade-level data and identified subject-level priorities based on student performance.

Finally, the team created a draft schedule, circulated to teachers, and made adjustments based on teachers' feedback. The previous scheduling process had been left to individual schools to manage and, in some cases, was still being done with pen and paper. But this new process provided centralized support to schools and established guidelines and a structure for schools to provide more equitable access to instruction. In walk-throughs the following year, over 90 percent of teachers were following the instructional guidelines, meaning students were receiving more equitable and consistent access to core content.[71]

Hoover High takes a similar approach. Phase I is relatively short at Hoover High—the core scheduling team is already established, with a vice principal, head counselor, and the principal—and the district distributes a master scheduling timeline to structure the process. Nevertheless, in the summer the team begins planning for the following school year. In Phase II they review schedule audit data from the previous year and review how they fared on the previous year's goals:

> In August of this year…we began the work for the 2021–2022 schedule. We have schedule audits that show us different things:…how gender was distributed, how students with IEPs are distributed, English Language Learners, what the workload looks like for each teacher in terms of class size, demographics, and gender. We get an idea of how last year's schedule played out: what our goals were and what reality was.[72]

In Phase II, beyond reviewing audit data, the team also begins conversations with academic departments and academy directors about their plans for the upcoming year and outlines goals and priorities. In December, Hoover High begins course articulation, which helps set it up to enter Phase III when the schedule is actually constructed.

In Phase III, "around February/March, when all the articulation is complete," Hoover's Vice Prinicipal Diane Conti uses Abl's scheduling software to build the schedule: "I can look at the class size, cohort students, evenly distribute students with IEPs and English learners, predict the conflicts." As she's working the schedule, she also continues to involve staff to discuss potential changes:

> I continue to have conversations with teachers [about] if there needs to be any shift in what they expect or if…some of our powerhouse teachers [need to] take on some of our more difficult courses [for] our students who are coming in not quite ready from middle school. Usually [these conversations] go on into the summer, because we get information about staffing and budget and teachers coming and going.[73]

If needed, Conti is also able to seek support from the district through things like master scheduling labs, "where you could sit with other administrators from similar schools and work together," or receive one-on-one coaching.[74] By the end of the school year, Conti is able to share a draft form of the schedule with teachers and students: "Usually we end the year by sharing with the teachers what they're going to teach. This [past] summer, we told students what classes they would have, although we didn't share the periods of the teachers yet."

Domains of work

Four domains of work cut across the scheduling process: project management, stakeholder engagement, design, and improvement.

Project management

Master scheduling advanced equity when approached as a collaborative process and when started well before the next school year. Starting early and working collaboratively enabled these districts to provide training and guidelines to support schools to take a more equity-centered approach to scheduling throughout each phase. The early start permitted districts to focus training on not just the logistics of scheduling but also, and especially, equity. For example, in San Diego, the district-hosted equity symposium brought together scheduling teams from various schools to review data and co-plan ways to use the data to inform scheduling changes.[75] These events provided much-needed time away from campus to focus expressly on the schedule.[76] This effort directly combated the impulse to view the schedule as merely operational or unrelated to disparities in access and opportunities, and it did so at a time when principals and scheduling teams could actually take some action by improving the schedule for the upcoming year.

A well-timed and collaborative process also enabled schools to more effectively engage the remaining three domains of equitable scheduling, providing enough time to complete a thorough review of the previous year's schedule; recruit broad and diverse participation from staff, students, and families in designing and improving the upcoming one; and incorporate those ideas and broader goals into the schedule's design. For example, by beginning her scheduling process in the summer, Conti is able to conduct scheduling audits and set scheduling goals, solicit feedback from academic department and academy directors and teachers, and conduct course recruitment and articulation—all in time to share draft schedules with teachers and class assignments with students by the end of the school year.[77] Shared timelines and designated roles help these schools and districts manage the scheduling process and complete it earlier than they had previously. In Keller Independent School District, a 35,000-student pre K–12 district around Fort Worth, Texas, a shared district timeline helps ensure all schools are able to share their schedules by May.[78] At Hoover High, Conti finds giving people specific "lanes" helps manage the process.[79]

Stakeholder engagement

Master scheduling advanced equity when all key stakeholders were involved in generating and supported in adapting to changes in the schedule. In some cases, these changes could significantly alter the way teachers work and students learned and required trust, communication, and broad participation to implement well.[80] In every instance, this meant principals were a key part of the scheduling team and made concerted efforts to be collaborative. For example, Hoover High School Principal Jason Babineau viewed it as his role to "ensure that [school leaders] are navigating all the opportunities that we can throughout our master schedule to create access and opportunities and success and equity for our kids." This included engaging the entire staff in leveraging the schedule as a strategic tool.

> **"** The master schedule is a significant tool that that can create opportunities and equity for kids. As principal, it's really about setting—through partnerships with administrators, vice principals, and teachers—what our vision is for our school and then determining how we can leverage the master schedule to meet the vision that that we have set for our school. **"**
>
> **JASON BABINEAU, PRINCIPAL**

This mindset helped create an environment where teachers at Hoover started to advance and implement their own ideas for scheduling solutions. For example, when Hoover discussed eliminating tracking in eighth and ninth grade to give students more access, teachers raised a concern about heterogeneous classes: students with vastly different skill levels in the same class. As a result, the schedule was adjusted to provide more time for planning and curriculum support. Math became a yearlong course, rather than a semester-long one, to ensure students had enough time to obtain conceptual math knowledge and skills and teachers had enough time to provide additional support to whoever needed it.

Trust and transparency also played a role in helping schools manage scheduling changes and engage in conversations about race and equity. Leslee Shepherd, the executive director of student advancement at Keller, spearheaded the master scheduling revision process.[81] She had hoped to provide more consistency across the district and improve the schedule's efficiency, especially regarding the use of teacher time. She relied on the relationships she'd built with principals to create a comfortable space for discussing inequities and justifying the rationale of leveraging the schedule to help address them:

> It's OK to say out loud, 'Why are my African American boys not in advanced-level science classes?' Let's talk about what's been happening but make it comfortable. I'm very proud of the relationships I have with our campus principals. They can call me and ask me anything. There's no judgment on my part. They know I'm going to put it right back in their court and say, 'Why do you think that's what's going on?' and provide the support that they need to fix it.[82]

Design

Master scheduling advanced equity when teams designed the structure of the schedule—from bell schedules to grouping strategies—to align with equity goals and prioritize student learning. In Bibb County, this meant carving out a separate intervention and enrichment block in the schedule to provide students across the district more consistent access to supports that did not interrupt core instruction. At Hoover High, leaders reorganized the school into wall-to-wall academies, providing over 2,000 students an opportunity to receive more individualized and consistent support and ultimately contributing to improved graduation and absenteeism rates.[83]

In other schools as well, schedulers designed the schedule to maximize student learning. One scheduler, observing how Black and Latino students were being tracked into lower coursework, collaborated with school leadership to offer more than one section of an honors course. This increased access to honors courses for students who had conflicting courses:

> I've been able to help them build more flexibility in the way they created their schedule so they can try to solve that problem at least a little.... For example, doing things like parallel classes—having two sections that meet at the same time with two teachers, so kids can have, let's say, an honors math class but not be in an honors class for other subjects. It allows for more flexibility, so kids have access to different levels of classes.[84]

In another high school, a flexible modular bell schedule divides the day into 21 intervals, known as mods, which last 20 minutes.[85] With this design, students can be more self-directed in their learning and teachers can attend to more individualized needs:

> One of the greatest things that I see is that this [flexible modular] system allows time to serve students, [instead of] students serving time. Meaning, if you're a student, I don't make you sit in a study hall when you have no need to or have no one to help you. I allow you to say, 'I don't need to go over there. I need to go to the math resource center because I need help with math today.' It really allows students to maximize their time. Another great thing is that it gives kids choice. It creates ownership over their learning because they get to make choices during the school day, and every day is not the same.[86]

Bibb County guidelines for instructional time

	K	1	2	3	4	5
ELA	120	120	120	90	90	90
Math	75	75	75	75	75	75
Science	30	30	30	45	45	45
Social Studies	30	30	30	45	45	45
Intervention/Enrichment	45	45	45	45	45	45
Specials	50	50	50	50	50	50
Lunch	30	30	30	30	30	30
Recess	25	25	25	25	25	25
Morning meeting	10	10	10	10	10	10
Dismissal	5	5	5	5	5	5
Total	420	420	420	420	420	420

FIGURE 7
Guidance provided by Bibb County Public School District for allocating time in the schedule. The table lays out the required amount of minutes to be spent daily on each subject in grades K-5. For example, in accordance with the guidelines, every first grade class would schedule a minimum of 75 minutes of math each school day.

Bibb County guidelines for intervention time

	Is pull-out allowed?
Reading	Never
Math	Never
Science	Yes
Social Sudies	Yes
Specials	Yes

FIGURE 8
Guidance provided by Bibb County Public School District for conducting interventions. To guard against students missing instructional time, the district only allowed for students to be pulled out of class for interventions in certain subjects: science, social studies, and specials.

Improvement

Master scheduling advanced equity when teams regularly evaluated the schedule's impact on student access and opportunity and advanced ideas for improvement. Leveraging data and tools, schools began every scheduling cycle with a study of the one that came before and made concerted efforts to make improvements in line with equity goals. Understanding the system by collecting and analyzing data helped teams set targeted improvement goals and generate ideas for achieving them.[87] Some schools started small with changes, beginning in a single grade or department, for example, rather than implementing them at a larger scale.

> Our social studies department was the brave group that said, 'We'll try it. We will get rid of levels.' They were our first department to get rid of levels. The student proficiency rates in social studies went up 30 percent, and that was the only change we had made. We didn't make any curriculum changes. We just eliminated those classes.… We then started looking at the proficiency data coming out, and it went up 30 percent on average every year once we did that. Now we've moved into other areas, and we're looking at the proficiency data in those areas as well. Our math data showed about a 15 percent increase in proficiency once we eliminated level three.[88]

In another instance, when Hoover High noticed that Black and Latino students were underrepresented in AP classes, they made concerted efforts over several years to change that reality. They partnered with Equal Opportunity Schools, an organization focused on improving equitable access to and success in academically rigorous programs, began using multiple measures to assess student readiness for AP, eliminated tracking in eigth and ninth grade mathematics to create a more level base, and provided AP teachers paid time over the summer to review profiles of AP students who might not have been in AP courses before de-tracking. This prepared teachers to provide them the necessary support. Conti explained, "We're trying to avoid the whole, 'Well, this student's GPA is 2.2. They don't belong here.' That's a conversation that has been eradicated in our work in three or four years. This is one of the tools that helps do that."[89] As a result, AP enrollment nearly tripled at Hoover High (Appendix B, Figure 11), with proportionate participation by students' race/ethnicity (Appendix B, Table 8).

Bibb County sample schedule and scheduling guidance

The district provided elementary schools with a sample schedule as well as guidance to help optimize the use of time

	Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Specials	I/E
8:20am	8:20a - 10:20a **English Language Arts**	8:20a - 9:05a **Intervention/ Enrichment**	8:20a - 9:35a **Math**	8:20a - 9:50a **English Language Arts**	8:20a - 9:35a **Math**	8:20a - 9:10a **Specials**	5	1
9:20am		9:05a - 11:05a **English Language Arts**				9:10a - 10:35a **Departmentalized Block 1**		
			9:35a - 10:25a **Intervention/ Enrichment**	9:50 - 11:05a **Math**	9:35a - 10:25a **Specials**		4	2
10:20am	10:20a - 10:50a **SS**		10:25a - 11:10a **Specials**		10:25a - 11:55a **English Language Arts**	10:35a - 12p **Departmentalized Block 2**	2	
	10:50a - 11:35a **Lunch**	11:05a - 11:45a **Lunch**	11:10a - 11:40a **SS**	8:20a - 9:50a **Intervention/ Enrichment**				3
11:20am	11:35a **Recess**	11:45a - 1p **Math**	11:40p - 12:20p **Lunch**	11:50a - 12:35p **Lunch**	11:55a **Recess**			
12:20pm	12p - 12:50p **Specials**		12:20p - 2:20p **English Language Arts**	12:35p - 1:20p **Social Studies**	12:20p - 1:05p **Lunch**	12p - 12:45p **Lunch**	K	
	12:50p - 1:35p **Intervention/ Enrichment**	1p - 1:50p **Specials**		1:20p - 2:05p **Science**	1:05p - 1:50p **Social Studies**	12:45p - 2:10p **Departmentalized Block 3**		K
1:20pm	1:35p - 2:50p **Math**						1	
		1:50p **Recess**		2:05p - 2:55p **Specials**	1:50p - 2:35p **Intervention/ Enrichment**	2:10p **Recess**		4
2:20pm		2:15p - 2:45p **SS**	2:20p **Recess**		2:35p - 3:20p **Science**	2:35p - 3:20p **Intervention/ Enrichment**	3	
	2:50p - 3:20p **Science**	2:45p - 3:20p **Science**	2:45p - 3:20p **Science**	2:55p **Recess**				5
3:20pm								

FIGURE 9

- Adhere to grade-level instructional minute guidelines to ensure students receive equitable access to minutes of instruction

- Stagger ELA and Math blocks within the schedule to maximize the reach and impact of student services and support providers

- Improve transparency of push-in support opportunities by clarifying components of core blocks

- Schedule as a team to leverage staff expertise and to build buy-in and schedule adoption
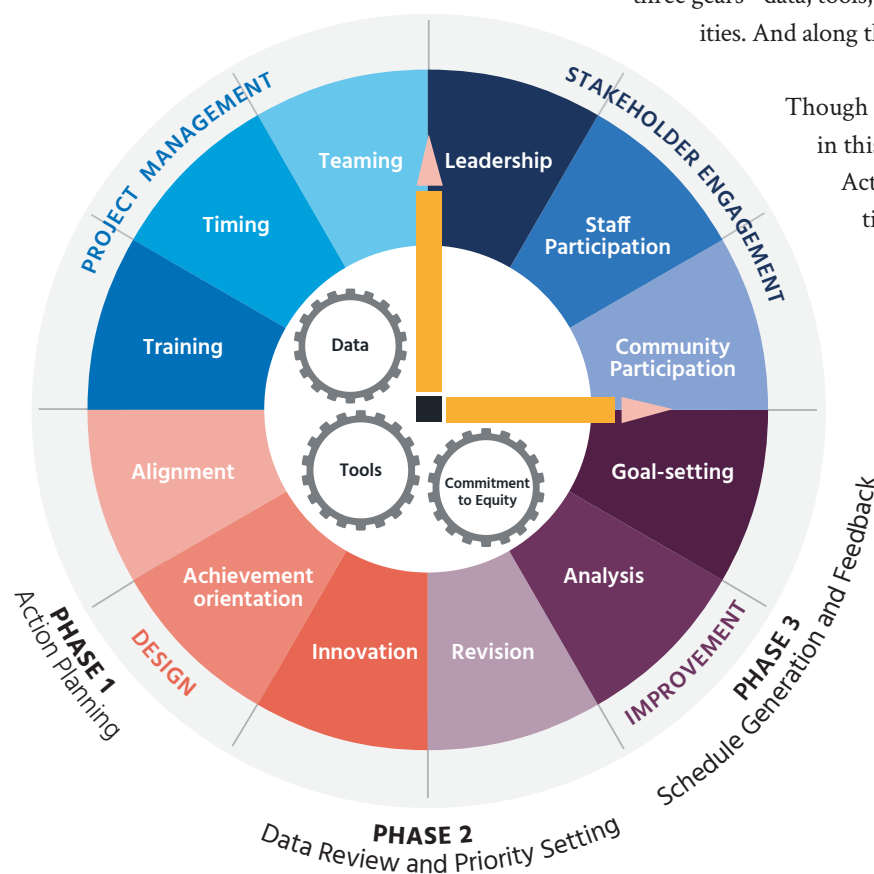
Part IV: Master Scheduling Equity Framework

Addressing the inequities that scheduling formalizes will require schools to abandon the purely technical approach to scheduling and adopt a more strategic one, dedicated to maximizing student access and opportunity and reducing disparities in access and outcomes. An enduring feature of systemic inequity is that without intervention, the same processes manufacture the same disparities. This unending cycle leaves some groups repeatedly underserved by systems meant to bring them safety, aid, or education. The master schedule is no exception. Those dreaded, generically prescribed, and seemingly operational processes, policies, and practices can become the centerpiece of a machinery that works from within the school itself to de-personalize learning and reduce access to opportunities.

Schools and districts must not simply stop practices or remove policies that disproportionately disadvantage and exclude marginalized students. They must take active and intentional steps to correct past and continuing harms. Whether they originate in the course of scheduling or elsewhere, inequities can be mitigated by the master schedule. But doing nothing allows them to persist.

Putting together the enabling conditions, the phases, and the domains yields the Master Scheduling Equity Framework (the "Framework") represented in Figure 10 below, which can be used as a guide for educators and school and system leaders looking to move from technical to strategic scheduling. The Framework takes the shape of a clock to represent the relationship between scheduling and time and to depict the cyclical and nonlinear nature of the included categories. Along the minute marks are the categories of activity, which are grouped thematically in the four domains. In the center are three gears—data, tools, and a commitment to equity—that power all the activities. And along the bottom, the three phases of work are represented.

FIGURE 10
The Master Scheduling Equity Framework

Though the process is represented by three sequential phases in this report, in practice the process is not always linear. Activities in different phases may take place at the same time, and a scheduling team may return to work from a previous phase even after they've progressed to the next one. Variations in state and district timelines, the organization of school calendars, and the frequency that schools reschedule mean scheduling looks different across settings.

What follows are key recommendations for schools and districts as they apply the framework. Each subsection includes the overall goal for the phase and a list of key shifts to go from technical to strategic scheduling.

Framework domains and categories

The Master Scheduling Equity Framework consists of the following four domains and 12 activity categories:

PROJECT MANAGEMENT

Project management brings together the right people on the right timeline with the right resources and support to manage the entire scheduling process toward equity-oriented goals.

TEAMING Engages a group with a range of perspectives and roles to facilitate the entire master scheduling process.

TIMING Provides sufficient time for the scheduling process and aligns key milestones with other key activities at the school or district level.

TRAINING Builds the team's capacity to deliver on scheduling goals by providing professional development, resources, and coaching to support the team through each phase of master scheduling.

STAKEHOLDER ENGAGEMENT

Stakeholder engagement involves securing the broad participation of stakeholders through transparent and open communication to increase understanding about the importance of scheduling, generate feedback to improve the schedule, and increase buy-in for planned changes.

COMMUNITY PARTICIPATION Updates and meaningfully engages families, students, and local partners through the process, providing updates and seeking feedback and questions.

LEADERSHIP Involves active participation of district and school leaders, including the principal, who lead the school to adapt new mindsets and practices and reinforce the connection between the schedule and actualizing school and district vision statements.

STAFF PARTICIPATION Updates and meaningfully engages all school-based staff throughout the process, seeking participation, questions, and feedback.

DESIGN

The schedule design is a responsive and student-centered approach to structuring time, student and educator placement, and the overall learning environment.

ACHIEVEMENT ORIENTATION
Prioritizes students' essential learning needs over other competing priorities, like long-standing norms and preferences.

ALIGNMENT
Repositions the master schedule as a core part of strategic planning, ensuring that it deliberately coheres with broader strategic goals at the school and district levels.

INNOVATION
Encourages new, more responsive approaches to scheduling, especially when schools and districts are in the early stages of using the master schedule strategically.

IMPROVEMENT

Improvement requires the regular and diligent review of key measures of the schedule's effectiveness and continual problem-solving to improve the schedule's impact on students' access and outcomes.

ANALYSIS
Leverages qualitative and quantitative data to understand how the schedule affects students with a focus on its impact on marginalized student groups.

GOAL SETTING
Generates clear mission- and vision-aligned expectations for the master schedule.

REVISION
Builds in opportunities to revisit and adjust the master schedule before implementation and annually, at least, after that.

Phase I: Action Planning

Building the master schedule is not merely an operational task. It is also a critical strategic activity for every school and requires adequate time and resources—as well as clear commitment from leadership—to do well. By the end of Phase I, the scheduling team will create a detailed scheduling plan and timeline with clear roles for each member.

Key actions in Phase I

PROJECT MANAGEMENT

Systems

- Share scheduling expectations, timelines, and parameters.
- Confirm partnerships with third-party providers and introduce them to school-based teams.

School

- Convene a core scheduling team, divide roles, and set aside time for regular meetings. Ensure the principal is a key member of the scheduling team.
- Set a timeline for the master scheduling process (or review a timeline provided by the district). Note when other strategic activities will occur (e.g., enrollment, budget, staffing allocations).
- If working with a scheduling service provider, schedule a kick-off meeting.
- Facilitate or attend training sessions.
- If a programmer or a technical scheduler is not on the core scheduling team, make plans to keep them updated on goals and priorities to keep in mind when building the schedule (e.g., creating a checklist, documenting expectations and priorities).
- Map out stakeholders and a plan for communicating with and including them.

STAKEHOLDER ENGAGEMENT

- Conduct focus groups or surveys or hold other forums to gather feedback from key stakeholders about their experiences with and perspectives on the master schedule.
- Identify broader team members (e.g., counseling team, department chairs) to include and check in with throughout the process.

DESIGN

- If considering an alternative scheduling structure or changes to the bell schedule, gather research on these alternative models.
- As a team, review the district and school mission and vision statements and any other strategic documents.

IMPROVEMENT

- Identify and gather data needed to measure the effectiveness of the schedule (e.g., school performance data, transcripts, schedules, AP test results), ensuring the data provides information on the experiences of marginalized student populations.
- Develop surveys and focus group materials to administer with staff and students.

> The time on the front end is alleviated on the back end. You can really get to work because the difficult and most important conversations have happened in terms of building equity for kids.
>
> **HIGH SCHOOL PRINCIPAL**

From technical to strategic scheduling: Key shifts in Phase I

Too often, master scheduling is delayed until the latest possible moment and ultimately delegated to an individual programmer or counselor with the skills to build a schedule that is technically sound yet disconnected from broader strategic goals.[90] By contrast, strategic master scheduling is team based, strategically timed, and guided by school and district mission, vision, and goals. This approach to scheduling calls for two key shifts in Phase I.

TECHNICAL SCHEDULING	STRATEGIC SCHEDULING
Delegates scheduling to an individual, self-taught programmer.	Engages and builds the capacity of a master scheduling team with strong, active participation from the school principal and representation from a variety of roles and perspectives (e.g., counselors, teachers, department chairs).
Views master scheduling as purely operational and isolated from broader strategic goals and activities.	Leverages the master schedule as a strategic tool for addressing priorities and goals. Times key scheduling activities to correspond with the occurrence of other strategic processes (e.g., budget and hiring).

Effective practices

Engage a master scheduling team

A master scheduling team should be as diverse in its composition as the schedule is in its influence. Its members should have a wide range of roles, perspectives, and insights. The bulk of master scheduling is too often left to a lone programmer who independently works out the complex puzzle of course requests and time constraints and produces a schedule that adequately allocates teachers, students, and courses. Although skilled programmers are invaluable to any scheduling process, the work of master scheduling should not be done in isolation.

To construct the master schedule is to give shape to a school's vision and priorities. That is not a task for a single or even a handful of individuals; it is the work of an entire school community. Engage a core scheduling team of three to five people with the experience, capacity, and commitment to lead an effective and inclusive master scheduling process. This group of core members will also be responsible for seeking broader participation from staff and families at key moments.

When forming the master scheduling team, include members who are:

- responsible for providing clear direction and cultivating a strong, positive culture for staff, students, families, and the community (e.g., principal, vice principal, district leader) Principals should take an active role in scheduling. They set the vision for the school, and the schedule is a foundational part of operationalizing that vision

- skilled and experienced with the technical aspects of scheduling (e.g., programmer, operations specialist)

- responsible for implementing the school's curricular and instructional program (e.g., teachers, department chairs)

- responsible for advising students and families in programs of study (e.g., counselors)

- proximate to subjects, programs, initiatives, and student groups identified as school or district priorities (e.g., families, students, institutional partners, special education educators, educators who work with ELLs)

- Skilled and experienced with data collection and analysis (e.g., teachers, data team members)

> **"** If one person is in their office doing it, there's a higher chance that it's not going to be something that is embraced throughout an entire campus. **"**
>
> **HIGH SCHOOL PRINCIPAL**

Strategically align scheduling, budgeting, and staffing timelines

The master schedule reveals a school's priorities. Over the course of this and the next two phases, the master scheduling team will generate actionable ideas for better leveraging the master schedule to manifest those priorities. For example, the team, in partnership with various stakeholders, may decide to increase the duration of instructional blocks, offer new courses, or adjust common planning time. Each possible adjustment is connected to other strategic decisions, most crucially budgeting and staffing.[91] To effectively allocate resources, create a scheduling timeline that lets the schedule's needs inform budgeting and staffing decisions.

- As feasible, enter budgeting conversations knowing whether scheduling priorities will include programmatic changes or shifts in staffing needs, which may require district approval and affect budget allocations. Let the schedule's demands inform budgeting and staffing decisions, rather than the other way around.

- To let the schedule's needs drive budgeting, begin the scheduling process early, as much as a year in advance. Provide the master scheduling team sufficient time to meaningfully engage stakeholders, analyze data, thoughtfully design the schedule, and strategically allocate resources to meet students' needs. The earlier in time the scheduling process begins, the better prepared the scheduling team to engage in intentional design, feedback, analysis, and revision.[92]

- Give particular thought to when the learning design and requests from students and staff will be complete, since these have the most implications for staffing and hiring.

Build the scheduling team's capacity through training, support, and resources

Master scheduling is a complex and challenging endeavor. To do this work most effectively, the scheduling team must be supported through high-quality and effective training and accessible scheduling tools. Despite the significance of their work, master scheduling teams are often expected to fulfill their responsibilities without clear guidance or support. A 2018 survey of elementary schools' scheduling practices conducted by District Management Group found that over 90 percent of respondents had received little to no training in scheduling in the previous three years, and only 13 percent considered themselves expert schedulers.[93]

- Offer regular coaching and support and documented timelines, policies, and guidance for completing the scheduling process. Training and support in Phase I should focus on a few key items:

  - Setting up the team and conditions for the team's success (e.g., support dividing responsibilities, project planning tools, norms and guidelines for managing documents, key dates and deadlines)

  - Communicating relevant district policies (e.g., institutional partnerships, collective bargaining agreements, capacity limits, graduation credit requirements)

  - Exploring the connection between master scheduling and equity, making clear ties between choices made during the scheduling process and disparities in student access and outcomes, staff retention, and family engagement

- Partner with third-party scheduling service providers who specialize in data-based and equity-focused scheduling to help facilitate the process. This can be particularly useful for a school or district in its early stages of leveraging the schedule for equity.[94]

  - At the very least, seek the guidance of the SIS provider and any district or school-based tech personnel to support the team members in accessing historical data and familiarizing themselves with features of the scheduling software that will be useful in Phases II and III.

Phase II: Data Review and Priority Setting

By the end of Phase II, the master scheduling team will have an enhanced understanding of the master schedule's impact on student experience and learning and, from that understanding, will generate specific, equity-driven goals and priorities for the upcoming schedule.

Key actions in phase II

PROJECT MANAGEMENT

- Facilitate or attend training on interpreting and generating strategies from collected data.
- For high schools, coordinate with other teams (e.g., counseling, ELL, special education) to communicate expectations around gathering course requests.
- If working with a scheduling provider, continue to discuss and review collected data.

STACKHOLDER ENGAGEMENT

System
- Share key insights with school leaders and any other stakeholder groups, and solicit improvement ideas.

School
- Share key insights with other stakeholder groups (e.g., staff, students), and invite their reactions and ideas for addressing the results.
- Support counseling team in advising students on course selections.

DESIGN

- Revisit the school and district strategic plan, and reflect on what the audit data reveals about the degree to which these strategic aims are being met.
- Revisit and revise course catalog and offerings based on audit data.
- Map barriers at the systems level that limit student access and opportunities.

IMPROVEMENT

- Assemble tools needed to conduct analysis (e.g., surveys, software).
- Conduct root cause analyses to better understand the underlying causes of this data.
- Identify changes to make in the upcoming schedule based on audit data.
- Set goals and priorities so the upcoming schedule can be measured.

" **Master scheduling…is a yearlong process. It never ends.** "

DEPUTY SUPERINTENDENT

From technical to strategic scheduling: Key shifts in Phase II

Strategic scheduling is keenly focused on the schedule's impact on student learning, particularly the degree to which the schedule exacerbates disparities in access and outcomes, and guided by a set of data-based and equity-driven goals and priorities. This approach calls for three key shifts in Phase II:

TECHNICAL SCHEDULING	STRATEGIC SCHEDULING
Limited or nonexistent analysis of the impact the master schedule has on student access and learning.	Deliberate analysis of the master schedule's impact on student access and learning.
Goals are primarily operational—every student has a schedule, allocations comply with state regulations and collective bargaining requirements—or overly generic, addressing all students and not acknowledging diversity of need and population. Priorities are based on long-standing traditions or norms—sometimes informal or unstated, without regard for their effect on students' essential learning needs or broader goals.	Goals and priorities are mission and vision aligned, grounded in historical data and trends, and explicitly directed toward disrupting disparities in student access and outcomes for most marginalized students.
Participation is limited from students and staff beyond completing a preference or course request sheet.	Early opportunities for deep and meaningful engagement with students, families, and staff, particularly those from marginalized groups.

> " I leveraged structure as a principal in the master schedule.… I didn't call them equity audits at the time. I called them transcript audits. I would run my transcripts every quarter when grades went in. Because I wanted to make sure that the vision I was casting to my staff was living for students. "
>
> **FORMER DISTRICT LEADER**

Effective practices

Analyze the impact of the master schedule

Take a close look at previous master schedules and transcripts, observing patterns within and across school years to spot specific ways the master schedule affects students' access to learning. In particular, observe disparities in access and outcomes that reflect historical patterns of inequality. These may be disparities in enrollment, course completion and success, participation in certain pathways, or even access to experienced teachers.

Assemble tools that enable the scheduling team to collect and analyze relevant information. The following are particularly useful:

- Audits

  Equity audits look more broadly than the master schedule at the entire system or organization and how it fares on measures of diversity, equity, and inclusion.

  Schedule audits track the students' movement from period to period throughout the day. They can be visualized using the "Sankey Diagram" in Part II. These can be useful for tracking how well students are grouped and where there are outliers (e.g., students leaving the group to take a specialized course).

  Transcript audits of individual students' course and credit accumulation are used at the secondary level. They illuminate key trends in course offering, course taking, and course persistence and track mobility over time.

- Scheduling software and data analytics tools: Most SIS include scheduling functionality, but there is also scheduling software that exists separately from the SIS. Scheduling service providers like Abl and District Management Group offer software and in-person support to organize and summarize key data points related to the master schedule. See the landscape analysis (Appendix A) for additional information about the functionality and offerings of common SIS and scheduling providers.

- Surveys and protocols: Whether creating new surveys and protocols or looking at existing surveys, these are useful tools for soliciting feedback from a broad group of stakeholders. It's essential at this stage to receive direct accounts from staff, students, and families about their perceptions of and experiences with the schedule.[95]

Leverage data to understand students', staff members', and families' experiences with the master schedule. Schools and districts are already in the practice of collecting data that can be used to better understand the impact of the master schedule, like enrollment and demographic data. See the landscape analysis (Appendix A) to understand the specific types of data available on commonly used student information systems and scheduling software. The scheduling team should ask the following questions as it conducts data review:

- Opportunities to learn: Are all students exposed to high-quality and rigorous content and the necessary support to thrive?

  What course-taking patterns can you observe, particularly in the following three categories?

  - Enrollment: Who is registered? Pay particular attention to enrollment in advanced and enrichment courses.

  - Persistence: Who completes the course or remains on a pathway until its completion?

  - Achievement: Who takes and passes coursework and associated assessments? In classes like AP or IB, take note if any students enrolled in the class are not sitting for the test at all.

  - Are the most experienced and effective educators paired with the students who will most benefit from their expertise and experience? By contrast, are new and inexperienced teachers disproportionately placed with particular students, subjects, or course levels?

- How well do course offerings meet the needs of the student population?

  Are there culturally responsive and sustaining offerings available that reflect the students' diverse backgrounds?

  Are all available courses setting students up for success (i.e., are all courses in the catalog preparing students for college or career)?

Selection and placement policies: How are decisions made about student and teacher placement?

- Are students assigned to a particular counselor more or less likely to enroll in certain courses or pathways?

- How many and which students received their first choice of course selection?

- How many and which teachers received their first choice of course selection?

- What prerequisites and screening are used to make placement decisions?

Demographics: Are students placed in environments that are representative of the demographic composition of both students and staff?

- Is there over- or underrepresentation of any racial, gender, ability, or language group in particular courses or pathways?

- Is there over- or underrepresentation of any racial, gender, or ability group in who teaches particular subjects or courses?

- Which student groups benefit most from the current schedule? Which student groups benefit the least?

Priorities: What factors most influence how and what scheduling decisions are made?

- What is treated as a nonnegotiable by the schedule?

  If possible, consult the previous years' schedulers. What was scheduled first? What was everything else scheduled around?

- How is success of the schedule measured?

- How much time is available for teacher collaboration? Are groups of teachers who share students or teach the same course available to collaborate at mutually convenient times? What is the ratio of instruction time to preparation or collaboration time available to teachers?

Engage in equitable data collection and review: Seek participation of a broad group of stakeholders, and focus data analysis on the structure, not the individual.

- Structural inequities persist when people of color and those most affected by decisions are excluded from conversations and decision-making. Seek the perspectives of students and families belonging to groups that have had less access or opportunity.

- Disaggregate qualitative and quantitative data to understand the differential impact the schedule has on student groups.[96]

- When discussing disparities, particularly disparities among racial groups, be careful to interrogate the system but not the culture or perceived values of a particular group. Ask questions that focus attention on what policies, practices, and decisions at the school and district levels may have contributed to these disparities. This not only prevents misplacing blame but can also focus the scheduling team on what is within its control.[97]

Set scheduling goals and priorities

The scheduling team should emerge from the analysis stage with an enriched understanding of the master schedule's role in student learning and experience as well as several ideas for making improvements. Based on analysis and feedback, set goals and priorities for the upcoming schedule that are aligned with the mission and vision of the school or district to improve equity. Without specific goals, it will be tempting to view the schedule as "successful" as long as students are in classes and teachers have assignments. Below are some examples of equity-focused priorities and goals that might emerge from a review of audit data:

Priorities

- Balance classes or academies by gender, language status, race, and ability.
- Ensure adequate time for collaboration among teachers.
- Provide ample time for students to receive necessary interventions without missing out on other core instruction (i.e., do not schedule intervention time over instructional time).
- Ensure all available courses satisfy college prep requirements.
- Schedule interventions so they are additive to rather than interruptive of core instruction.
- Adjust the bell schedule, school calendar, and start and end time of the school day to better accommodate learners' needs.

Goals

- Maximize students' access to rigorous coursework and accompanying support.
- Increase enrollment in dual-enrollment or college access courses.
- Ensure student groupings share particular teachers (e.g., math, English, and social studies teachers all teach the same group of students).
- Increase enrollment in advanced courses.
- Eliminate tracking (by removing all tracks or by removing levels in a particular subject and grade).
- Eliminate prerequisites.
- Share draft schedules with students and families before the last day of school.

Phase III: Schedule Generation and Feedback

Phase III puts in place all key inputs necessary to build the schedule, including changes to learning design, policies, and structures necessary for meeting equity-driven goals and priorities from Phase II as well as student and staff preferences.

Key actions in Phase III

PROJECT MANAGEMENT

- Communicate with the programmer to resolve conflicts and ensure priorities are observed.
- If applicable, share schedule drafts with district personnel for review and approval.

STAKEHOLDER ENGAGEMENT

- Share draft schedules with staff and invite feedback.
- Share draft schedules with students and invite feedback.
- Discuss design changes with staff members who may be especially affected by them, and offer support adapting. Incorporate ideas if possible, and hold firm if the planned change makes crucial improvement toward equity goals.

DESIGN

- Build the schedule.
- Prioritize students' essential learning needs by building the schedule around those needs (in many instances, this means the priorities get scheduled first).
- Continually revisit goals and priorities while building the schedule to handle trade-offs and resolve conflicts.
- Document fork-in-the-road moments and discuss before finalizing the schedule.
- Remove barriers and gatekeepers in the schedule (e.g., exclusionary prerequisites).

IMPROVEMENT

- Redouble recruitment efforts to meet goals around demographic balances and representativeness in prerequisite and advanced coursework.

WHEN TRADITION MEANS EXCLUSION

For schools just beginning this work, one challenge that might arise is if a key barrier to equitable access and outcomes is also a likely nonnegotiable. From concert band to French class and championship-winning sports teams, there are certain aspects of a school community around which everything else is organized, including the schedule. But as Phase II may have revealed, tailoring a schedule to the demands of rehearsal times, away games, or a beloved teacher's preference can compromise equity and access to essential learning for some.

> "Everybody wants third period off. Or all the coaches need fourth period off because most of them have practice after school. Or the band director may want all his band kids to have fourth period off. That's nothing that's in writing. That's just something that they'll come to the scheduler and say."
> **SCHEDULER**

This prioritization runs counter to equity but may be among the more difficult changes to make. The scheduling team should identify which proposed changes might fit into this category and strategize approaches in the short and long term for mitigating and eliminating any negative effects on marginalized students' access and opportunity to learning.

> "There are some things that you're never going to change.... There are some things that are so important to the community, such as an important tradition—whatever it is—that there's nothing you can do about it."
> **DEPUTY SUPERINTENDENT**

From technical to strategic scheduling: Key shifts in Phase III

Leaders have the power to change the systems they inherit. They have a mandate to do so when, as is often the case, structural arrangements reproduce inequity. Equipped with a richer understanding of the schedule's effect on students' experience and learning, the scheduling team in Phase III has the chance to construct a new reality for students, removing the scheduling structures and policies that preserve barriers over opportunity and replacing them with active and intentional designs to increase access and improve outcomes. This approach calls for three key shifts in Phase III:

TECHNICAL SCHEDULING	STRATEGIC SCHEDULING
Decisions driven by default or preferences.	Defined goals, priorities, and marginalized students' essential learning needs drive scheduling decisions.
Scheduling is left to the schedulers.	Staff, students, and families are informed about changes and given the opportunity to influence them.
Gatekeeping policies bar marginalized students from accessing advanced coursework and enrichment opportunities.	Underrepresented students are actively recruited for and supported in taking prerequisite and advanced coursework. Policies resulting in the disproportionate exclusion of marginalized students are eliminated.

Effective practices
Prioritize the essential learning needs of marginalized students

The scheduling team makes countless decisions when building the schedule. Will there be multiple lunch periods or only one? Who will have a prep fifth period? Where and when will interventions take place? Schedulers must also regularly make trade-offs, selecting one scenario over competing ones. These details may seem minor, but they determine whether equity is advanced or lost. Decisions made without a full understanding of the impact risks sacrificing students' essential learning needs for comparatively less essential preferences or privileges. Marginalized students are particularly harmed by passive decision-making that does not explicitly assess and prioritize increasing equitable access and opportunity.[98] To counter this:

- Begin by scheduling the priorities identified in Phase II. This may mean scheduling certain groups of students first and shared collaboration blocks for educators. Then scheduling everything else around them. This safeguards against priorities being cast aside or overshadowed by another scheduling arrangement that also works on a technical level but falls short on maximizing access and opportunity.

- Ensure the skilled programmer who is utilizing software or tools to program students and construct the schedule understands the priorities developed in Phase II and has them on hand to consult throughout the process.

- As a scheduling team, carefully document and discuss the fork-in-the-road moments when only one selection can make it into the final schedule. Before finalizing the schedule, review these decisions and how they might affect marginalized students. Make adjustments to any scenario that has a disproportionately negative effect.

- For larger-scale or harder-to-shake scheduling components that limit access and opportunity but may take longer than a single scheduling cycle to adjust, make a plan to build buy-in for change or for an alternative arrangement to eliminate the negative impact on students disadvantaged by the decision. For example, trying a different way of sorting students in one grade or subject area before implementing more widely.

Trade gatekeeping for inclusion

Gatekeepers decide who receives access to certain spaces and resources. In building the master schedule, the scheduling team performs this role—deciding who gains access to particular instruction and educators as well as the criteria for permitting or denying entry. Phase II may reveal that a feature of the existing master schedule is to separate; white from Black, monolingual from bilingual, students with IEPs from those without. When the master schedule negotiates access in a way that mirrors societal disparities across race, socioeconomic status, and disability, the scheduling team must reevaluate and replace existing policies and practices with more equity-focused ones.

More specifically, the team should:

- Remove barriers to accessing rigorous coursework and enrichment opportunities.
  - Investigate the explicit or tacit requirements for accessing these courses. Consider their validity—do they actually measure students' readiness for advanced coursework? Eliminate prerequisites that disproportionately screen out student groups.
  - Expand the criteria on which students' readiness for advanced coursework is assessed. Equal Opportunity Schools, an organization focused on improving equitable access to and success in academically rigorous programs, recommends looking beyond students' grades and test scores to additional criteria like students' aspirations, learning mindsets, and strengths.[78]
  - Consider eliminating tracking as a way to prepare larger numbers of students for rigorous coursework.[100]
  - Ensure all students have a counselor or an adult staff member to advise them in making course selections.
- Strengthen targeted, race-conscious, recruitment efforts for advanced classes.
  - Discuss the benefits of advanced coursework with students and families and leverage teaching staff to encourage enrollment.[101]
  - In instances where there is limited capacity, begin by enrolling first-time AP or IB takers to ensure they receive a seat.[102]

> **"** We found that counselors were some of the greatest gatekeepers in the district. Many of them were approaching things with care. But some with a deficit mindset...We kept putting in front of them the decisions they were making, and it did start to loosen the mindsets they have. **"**
>
> **FORMER DISTRICT LEADER**

- Address all barriers to accessing rigorous coursework, not just enrollment barriers.

  – Monitor who is enrolling in classes, but also closely watch patterns in course persistence and test-taking rates and scores.

  – Adopt add and drop policies that provide opportunities for support and intervention before a student leaves a course (e.g., mandating a meeting with the principal).[103]

  – Make strategic decisions about which educators to assign to AP classes and prerequisites, considering their skill as a teacher and ability to support students from various backgrounds rather than basing the decision solely on seniority or tradition.

- Build the capacity of school counselors to support students with course selection. Provide them with tools to clearly communicate course options and their impact on students' learning paths.

  – Discuss and share data about the course-taking patterns of students under their advisement. They may be unaware of the aggregate effect of their advice to students. For example, recent research shows that talking to a counselor actually makes it less likely that Black Latino students will persist in or advance to accelerated tracks in mathematics.[104]

- Centralize support and approval of final schedules. District offices can play a critical role as schools build schedules. In some cases, the district performs an audit, similar to the one performed by the scheduling team in Phase II, to ensure that the school's schedule is aligned with school and district priorities.

View all families as equally important partners in supporting student learning

Equity demands renegotiating arrangements of power, decision-making, and participation. Meaningful participation from staff, students, families, and the community is integral to increasing access and opportunity through the schedule. Partnership with families is particularly valuable—breaking boundaries between school and home and strengthening students' learning as a result.[105] But when it comes to scheduling, familial involvement has been described as a double-edged sword, with some parents wielding influence to secure the best for their children to the detriment of the broader community.[106]

When building the schedule, take steps to neutralize imbalances in familial influence and create policies that lay the groundwork for more equitable familial participation:

- Engage the scheduling team in discussions about addressing institutional inequality. Discuss the role of opportunity hoarding,[107] implicit bias, and racialized policies in the educational context.[108]

- Share draft schedules with staff, students, and families before school dismisses for the summer. This will provide ample time for multiple viewers to spot and correct any errors. The timing also allows additional time to redouble recruitment efforts for advanced coursework before school begins.

  - Schools can be hesitant to begin scheduling until enrollment, hiring, and other details are finalized. Details can be refined over the summer, but aim to have initial schedules out beforehand. To support with this, gather historical data to use as projections and set the expectation with students, staff, and families that tweaks and updates will be made in late summer as new information arrives.

  - Expand the reach of recruitment and information sharing to target feeder schools with high populations of marginalized students to reduce any information gaps in navigating course selection.

> " Family is a really interesting double-edged sword in education. On the one hand, families bring crucial resources. They understand children. They advocate for children. You can't imagine an equitable or desirable educational environment that keeps the family out. It's crucial. On the other hand, because we live in an unequal society with different sets of resources and understanding the way school works, in practice family involvement generally drives and reproduces inequality. "
>
> **PROFESSOR AND RESEARCHER**

CONFLICT RESOLUTION DAY

In one high school using a flexible modular schedule, it's not left up to the scheduling team to resolve every conflict. Students are invited to join the process as well. The principal explained, "Once we do our best getting rid of the big conflicts, those leftover things are things that we can't just automatically fix, so we put that in the hands of our kids."[109] During an event called Conflict Resolution Day, students work out conflicts in their own schedules by talking to teachers. Since the school day is divided into 20-minute classes, or "mods," sometimes conflicts are only a matter of a few overlapping minutes. The entire ethos of the flexible modular schedule is to give students more ownership over their learning and their day, and conflict resolution day is right in line with that.

Part V: A Catalyst for Change

The master schedule contains vast opportunities for focusing on and meeting student needs and increasing equity of access and outcomes for marginalized student groups.

Recent shifts in light of the coronavirus pandemic suggest that schools and systems may be more poised than ever to make strategic use of their schedules. Self-consciously or not, during the pandemic, educators, schools, and systems took up practices captured in the Master Scheduling Framework. The schedule may have been viewed as purely logistical and operational before the pandemic, but the pandemic has laid bare just how much master scheduling drives the school.

As they were suddenly thrust into remote learning, some schools and districts began to shake loose long-held assumptions about the structure of the school day and the process of scheduling. They designed schedules that allocated scarce resources according to need rather than privilege, and they adopted scheduling structures that had been challenging to achieve because of prepandemic parameters.

Some school leaders spotted an opportunity to adjust what had always been done with their schedules, a moment that one principal called the "Wild West." Parameters that had constrained schedules were lifted or weakened, creating an opening to schedule in a different way. In one school, the scheduling process became more collaborative than ever, bringing students and staff together on a remote learning committee to discuss and design a new schedule.[110] Another district did "something it had never done before": It created a schedule of rotating music and art classes.[111] In one instance, a school put into place a schedule it had long wanted to use but couldn't because of constraints:

> This block schedule has always been our dream to have as our regular schedule, but it never worked out because of teacher union conflicts and stuff like that. But we all basically went into the Wild West in March: 'You know what? This is what we're going to do.' We split into three blocks, and every day a student would have only a maximum of three periods. They spread it out over the course of the day from 9 to 10:15, 11 to 12:15, and 1 to 2:15. Three 75-minute blocks with 90 minutes of instructional content time built into it.[112]

In this new remote and hybrid context, previously accepted policies and parameters were seen in a new light, not as mere annoyances but as barriers to operating flexibly and in line with how the school assessed students' needs. For example, in the school with the remote learning committee, the principal felt frustrated by requirements that hampered his ability to meet the moment.[113] One CMO leader felt a renewed charge to update the schooling structures that were relics of another era: "This is a great time in our lifetime to work with policymakers to revisit some of those industrial days of attendance that just don't make sense for what we're trying to accomplish."[114]

By the fall, schools weren't solely thinking of new ways to schedule because of the pandemic; they were generating new ways to do so equitably. If the spring was the shock to the system, breaking the cast of the status quo and the confinements of parameters, then the fall was the first pilot, when some

schools and districts used the summer to make intentional and innovative scheduling designs. The opportunity that the pandemic presented, for not just master scheduling but the entire structure of school, started to become clear:

> "Think about if you could create a new master schedule for a child every day depending on what they actually need help in, for that area and grade level. It changes how we think about master scheduling. If we could change it going into this pandemic and differentiate instruction through distance learning…it changes the whole [thing] around."[115]

One district took the opportunity to more equitably group students and apportion limited resources, which in this instance was access to the school building. The district set up a priority system: Younger children, students with individualized plans (e.g., IEPs, 504 plans), and any student who had not fared well during the remote learning experience in the spring were offered first priority to opt in to in-person learning five days a week. Another started planning ways to increase students' access to learning by creating a scheduling scenario for a 12-month school year.[116] In another instance, two schools joined forces to offer a course that neither could offer individually but could meet the enrollment required to offer it jointly.[117] Another district planned to continue offering increased access to remote learning for students with disabilities who may not have been able to attend school in person.[118]

In all cases, they leveraged data, tools, and a commitment to equity to effectively manage massive change in a short amount of time, meaningfully engage stakeholders—especially teachers and families—design schedules to proactively mitigate disparities in who could access learning, and measure and improve upon strategies based on their impact on students' experiences and access to learning.

Looking ahead, the master schedule will be essential for leaders who plan to arrange school structure, timing, and operations to mitigate inequities exacerbated by the Covid-19 pandemic. Whether to address lost learning time, to provide more socio-emotional or mental health supports, or to integrate some of the innovations born out of the pandemic into the regular school day and year, all leaders will be served by a strategic approach to scheduling that brings the use of time into alignment with broader goals. In the wake of a pandemic that has highlighted so much about inequity, the recommended domains of the Framework and its three essential conditions can help schools and school systems organize a plan to expand marginalized students' access to opportunity and learning at a time when it is sorely needed.

> " I really do think that it's helpful for those of us who are a step out of the trenches in education to think big thoughts right now. Because, the system's going through a crisis, and it's not going to come out the same way. There's a ton of risk there, but there's also a ton of opportunity there. "
>
> **RESEARCHER**

Appendix A: Landscape Analysis of Scheduling Tools and Software

Introduction

As shown in the Master Scheduling Equity Framework, tools are a key driver of strategic scheduling. The scheduling teams we spoke with relied on a range of tools—SIS, scheduling software, consulting support, data analytics tools—to schedule more strategically. All of them relied on specialized scheduling software, like Abl's, which included enhanced usability and efficiency. The goal of this landscape analysis is to provide an overview of some of those tools and the functions that may make them particularly useful in assessing whether the existing master schedule undermines equitable access to key courses, programs of study, and other resources and in creating new master schedules that maximize access and opportunities to learn. This analysis is organized into two parts: The first part provides results and findings from the SIS and scheduling software survey. The second part lists SIS, specialized scheduling software, consulting services, and data analytics tools available to support schools and districts with the master scheduling process.

A survey of SIS and scheduling software providers

To complete this analysis, CPRL surveyed a set of SIS and scheduling software providers about their functionality. The list of providers to survey was narrowed to include only those that provided the ability to construct a master schedule. Scheduling providers and tools that only analyzed data or that exclusively provided consulting support were excluded from the survey but are included elsewhere in the analysis. Twenty-five service providers were invited to participate in the survey, and eight completed the survey: five were SIS providers, and three were providers of other specialized software.

The survey asked a series of questions about three aspects:

1. Access to data—what information users are able to view

2. Intelligent error detection—whether users receive alerts or notifications of errors as they schedule

3. Customization and scenario planning—the ability for users to customize tools and construct multiple scheduling options

TABLE 1

Shows a summary responses across all three categories

Survey Response Summary: Number of "Yes" responses per question in each category

Software	SIS	Access to data			Error detection	Customization and scenario planning	
		Can users view student information?	Can users view teacher information?	Can users sort information?	Can users receive error alerts?	Can users add customizations?	Can users schedule for different scenarios?
Abl Master Scheduler		5/5	2/5	19/22	5/7	2/2	2/2
Aeries SIS	▮	5/5	5/5	22/22	6/7	2/2	2/2
Class Creator		5/5	0/5	22/22	3/7	1/2	2/2
Synergy SIS	▮	5/5	5/5	22/22	7/7	2/2	2/2
Aspen SIS	▮	5/5	5/5	22/22	7/7	2/2	2/2
Gradelink SIS	▮	5/5	4/5	11/22	2/7	0/2	2/2
Schedule My Teachers		0/5	0/5	0/22	0/7	0/2	1/2
Sycamore School	▮	5/5	5/5	4/22	5/7	0/2	1/2

Access to data

Schools rely on data disaggregated by student subgroup to spot ways the schedule may limit access and opportunity for certain student populations. CPRL surveyed providers about users' ability to view student and teacher demographic data when using their tools. The survey also included questions about users' ability to sort enrollment, teacher assignment, grade distribution, and course requests by student group (e.g., to tell whether students with IEPs are taught by only some teachers or how many Latino students submitted a request for AP chemistry).

Results from the survey can be found in Table 2 and Table 3.

Key findings regarding access to data

- Student demographic information is visible in nearly all (seven out of eight) the tools

- On the other hand, information about teachers' demographics and backgrounds was less frequently available, with only half (four out of eight) tools letting users view all five details about teachers (experience, prep schedule, race and ethnicity, certification, and teaching load) while scheduling.

- Student demographic data is visible in these tools, but it's not always easily used to produce insights about disparities among subgroups. Only half (four out of eight) tools let users sort grade distributions, class enrollment, course requests, and teacher rosters by student subgroup.

TABLE 2
Shows a summary of responses regarding users' ability to view data.

Tool	SIS	What student information can users view?					What teacher information can users view?				
		language	disability status	race and ethnicity	gender	SES	certification	teaching load	race and ethnicity	experience	prep schedule
Abl Master Scheduler		•	•	•	•	•		•			•
Aeries SIS		•	•	•	•	•	•	•	•	•	•
Class Creator		•	•	•	•	•					
Synergy SIS		•	•	•	•	•	•	•	•	•	•
Aspen SIS		•	•	•	•	•	•	•	•	•	•
Gradelink SIS		•	•	•	•	•	•		•	•	•
Schedule My Teachers											
Sycamore School		•	•	•	•	•	•	•	•	•	•

In what ways can users sort information?

Tool	SIS	Sort grade distribution by...							Sort class enrollment by student...					Sort teacher rosters by student...					Sort course requests by student...				
		student language	student disability status	student race and ethnicity	student SES	teacher certification	teacher experience	teacher race and ethnicity	language	disability status	race and ethnicity	gender	SES	language	disability status	race and ethnicity	gender	SES	language	disability status	race and ethnicity	gender	SES
Abl Master Scheduler		•	•	•	•				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Aeries SIS	�	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Class Creator		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Synergy SIS	▪	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Aspen SIS	▪	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Gradelink SIS	▪	•	•	•	•	•								•	•	•	•	•					
Schedule My Teachers																							
Sycamore School	▪	•		•	•																		

TABLE 3
Shows a summary of responses regarding users' ability to sort data.

Intelligent error detection

Master scheduling is a complex process with many moving pieces. One function that can help schedulers keep equity concerns top of mind while sorting through myriad technical details of scheduling is intelligent error reporting. This can alert users to things like demographic imbalances and improperly scheduled students so they can proactively address them. Survey results can be found in Table 4.

Key findings regarding error detection

- The most commonly detected error was course conflicts, with seven out of eight tools including that feature.
- Among the least common error alerts are those that have affected marginalized students' access to learning and positive outcomes.
  - Only half (four out of eight) of the tools alerted users to demographic imbalances
  - Only half the tools (four out of eight) alerted users when a student was scheduled for a course already taken
  - Only half the tools (four out of eight) alerted users when a student was not scheduled for a course needed for graduation
- There were fewer tools with built-in alerts for errors that might indicate tracking, segregation, or if a student is on track to graduate, but five tools gave users the ability to set custom features.

Sidebar: Error Detection Questions

How does the tool alert users of potential errors? Does it:

1. Alert users to course conflicts for individual students
2. Alert users to demographic imbalances in individual classes
3. Alert users to imbalances in teacher load
4. Alert users when a student is scheduled into a course they have already taken
5. Alert users when a student is not scheduled for a full course load
6. Alert users when a senior in high school is not scheduled for a course needed for graduation
7. Let users set custom alerts

TABLE 4: Shows a summary of responses regarding error detection.

Tool	SIS	What potential errors are users alerted to?						
		Course conflicts	Demographic imbalances	Teacher load imbalances	Duplicate courses	Incomplete course load	Missing courses for graduation	Set custom alerts
Abl Master Scheduler		•	•	•		•		•
Aeries SIS	▓	•		•	•	•	•	•
Class Creator		•	•	•				
Synergy SIS	▓	•	•	•	•	•	•	•
Aspen SIS	▓	•	•	•	•	•	•	•
Gradelink SIS	▓	•						•
Schedule My Teachers								
Sycamore School	▓	•		•	•	•	•	

Customizations and scenario planning

When scheduling strategically, schools may opt to schedule according to specific priorities. For example, ensuring that intervention and enrichment blocks occur simultaneously, or placing all students with IEPs and their associated teachers into the schedule before building the rest of the schedule. During the pandemic, schools were in need of tools that helped them create multiple scenarios—in the event that schools remained hybrid or returned in person, or that the maximum number of students allowed in class together increased or decreased—and to organize time for teachers and students who were learning in different settings (some remote, some hybrid, some in person). We surveyed providers about their tools' ability to let users schedule according to priorities and plan for multiple scenarios. Survey results can be found in Table 5.

Key findings regarding customization and scenario planning

- Most (six out of eight) tools include the option to create multiple and hybrid schedules. At the time of this survey, the pandemic had been active for several months, and we suspect these features were particularly in demand. But we did not survey providers on whether these were new or existing features.

- The two tools that provided only some scenario functionality provided the ability to create either multiple scheduling scenarios (but not to create hybrid ones) or hybrid schedules (but not multiple scheduling scenarios)

- Only four out of eight tools allowed for both types of customization.

TABLE 5: Shows a summary of responses regarding users' ability to make customizations and plan for multilple scheduling scenarios

Tool	SIS	In what ways users set custom features?		In what ways can users schedule for different scenarios?	
		set course priorities	schedule particular student first	create hybrid (online and in-person schedules)	visualize multiple possible schedules
Abl Master Scheduler		•	•	•	
Aeries SIS	◼	•	•	•	•
Class Creator		•		•	
Synergy SIS	◼	•	•	•	•
Aspen SIS	◼	•	•	•	•
Gradelink SIS	◼			•	
Schedule My Teachers					
Sycamore School	◼				•

Conclusion

Effective tools help drive strategic scheduling efforts. They can give schedulers access to critical, real-time data about the schedules' impact on students' ability to access effective teachers, coursework, and diverse peers. Without effective tools, schedulers must resort to time-consuming and sometimes rudimentary practices, which may detract from efforts to schedule more strategically. All of the featured districts used specialized scheduling software, like Abl's, which provide additional and critical features that are not found in many SIS. Tools may provide needed inputs for scheduling strategically, but they must be combined with data and a commitment to equity in order to successfully be leveraged as tools for maximizing equity.

Scheduling service providers

Below is a complete list of the scheduling tools, providers, and services we encountered during the study.

SIS

- Aeries SIS
- Aspen SIS by Follet
- Blackbaud
- Core SIS by Alma
- Edupoint SIS by Synergy
- EduWave K–12 SIS by Integrated Technology Group
- Gradelink SIS
- Infinite Campus SIS
- Maestro SIS by Bocavox
- PowerSchool SIS
- QuickSchools
- SapphireK12
- Skyward Student Management Suite
- Sycamore School
- Tyler SIS

Scheduling Software

- Class Creator
- DMSchedules by District Management Group
- Enriching Students
- Master Schedule Builder by Rediker
- Master Scheduler by Abl
- Schedule My Teachers
- Scheduling Plus by Rediker
- School Insight by Common Goal Systems
- USA Scheduler School Master Scheduler

Consulting Services

- Abl
- District Management Group
- Merenbloom Seminars & Consulting

Data Analytics Tools

- Campus Analytics Suite by Infinite Campus
- District Schedule Audit by Abl
- Schoolzilla by Renaissance
- Synergy Analytics by Edupoint

Appendix B: Herbert Hoover High School Case Study

Leveraging the Schedule to Increase Access to Challenging Coursework: Herbert Hoover High School

Summary

CHALLENGE	In academic year 2014-2015, over half of the student population at Herbert Hoover High School did not meet UC A-G college entrance requirements and few students were enrolled in AP.
STRATEGIC APPROACH TO SCHEDULING	Leaders at Hoover decided to change their approach to scheduling – dividing students into smaller academies, eliminating tracking in mathematics, and expanding criteria for enrolling in AP courses – in order to increase students' access to rigorous coursework and the supports needed to thrive academically.
OUTCOMES	Students at Hoover now experience expanded access to coursework that meets A–G requirements. 75 percent of Hoover's students met A–G requirements in academic year 2018–2019. In addition, AP enrollment nearly tripled at Hoover there is proportionate participation in AP based on students' race or ethnicity.

School Profile
Herbert Hoover High School in San Diego, California

2,719	Students
92.4%	Socioeconomically Disadvantaged*
21.6%	English Language Learners
9.9%	Students with disabilities
76.7%	Latino
11.8%	Asian
7.3%	Black
1.3%	White

*"Students who are eligible for free or reduced- priced meals or who have parents or guardians who did not receive a high school diploma."

Source: California School Dashboard

When Vice Principal Diane Conti first arrived at Herbert Hoover High School, the master scheduling process looked a lot different from now. It was a "scramble," Conti said. Teachers weren't involved, structures and processes to support the counseling team were lacking, and students wouldn't have their schedules for weeks after school began. Conti recalled what the first few days of school looked like then:

> There was about two to four weeks at the start of the school year…where students and teachers didn't have schedules. The scheduling wasn't even done when school started.… Some kids were in the gym, some kids were in the cafeteria, and some kids weren't in classes for a whole month. When you know what you know about students coming in and only 30 percent of them are reading at grade level, that's an incredible waste of time. There was not a plan and not a strategy.[119]

Conti, in partnership with Principal Jason Babineau, set out to address some of Hoover High's most persistent challenges, including chronic absenteeism and low graduation rates, by using the schedule more strategically. "There was only room to grow," Conti said, "We were really excited to take part in that work with the teachers and students and families."

And grow they did. From 2014 to 2017, Hoover High made several changes to scheduling that contributed to improved graduation rates, decreased chronic absenteeism, and expanded access to rich and rigorous coursework, including college acceleration courses.

Uncovering disparities in access and outcomes at the district-level

Years earlier at the San Diego Unified School District Central Office (Education Center), Cheryl Hibbeln began developing what became a district-wide approach to more supported, coordinated, and equity-focused master scheduling. Asked to support the district in revising its high school graduation requirements to align with A–G requirements, Hibbeln relied on a tool she'd used while principal at Kearny Senior High School: transcript audits. As a principal, Hibbeln printed and reviewed student transcripts every quarter to "align structure to instructional efforts" and to help answer the question, "are our actions matching our mission?" At the central office she sought to answer the same question, this time for thousands more students.

That first year she conducted audits entirely by hand with the help of five other people. Together, they uncovered how scheduling practices limited students' access and opportunity, specifically:

- Access gaps existed between students who met A–G requirements and those who did not.

- Students were not always well supported in selecting courses, which led to enrollment disparities in college acceleration courses like advanced placement.

Using tools and data to uncover and address disparities at Hoover

Data and tools play a key role in Hoover's approach to master scheduling. Just as Hibbeln did for the district, Conti and Babineau regularly review audit data. With the help of Abl Master Scheduler, scheduling software that works on top of the student information system (SIS) to provide increased usability, functionality, and access to data, Conti is able to spot scheduling inequities and work to address them. For example, using Abl, Conti is able to see where there are significant differences between the school's demographics and the demographics of students enrolled in a particular course or assigned a particular teacher. She and her team can then share this data with teachers and engage in conversations about addressing the disparities. Seeing the data makes it clear to everyone why change is needed and helps create buy-in. Conti explained: "When the teachers see that one teacher during the day or two teachers during the day have an all-female class, it doesn't take long to convince them

that it should be a little different." These conversations extend beyond gender to race and language status, giving Hoover's staff a more complete picture of the effect scheduling has on marginalized students and proactively putting them in a position to improve.

In addition, Conti and her team also use tools provided by the district which set timelines and expectations for the scheduling process. These include:

- Master Schedule Expectations: Using the data from the equity audit, the district distributed a document for middle and high schools to guide schools in building their master schedules. These included particular ways of scheduling English Language Learners (ELLs) and organizing teacher preparation periods.

- Master Schedule Placemat: Another tool that emerged was a placemat or time line that integrated the master scheduling process with budget and staffing time lines to integrate these strategic processes.

- Mindset and Online Student Profile System: These tools helped Hibbeln and others to more rapidly and efficiently access and analyze schedule data. Instead of taking days to complete, transcript audits could be accomplished in minutes.

Scheduling to increase access and opportunity

At Hoover High, Conti and Babineau built on the work that Hibbeln and others had started and strove to reduce disparities in student access and outcomes by taking a more strategic approach to master scheduling. Adding to the efforts already underway to increase the number of students who met A–G requirements, leaders at Hoover made four additional changes to the schedule to improve students access and opportunity to learning and overall readiness for postsecondary plans.

Converted to a wall-to-wall academy model

One significant change was the decision to move to a wall-to-wall academy model. Says Conti, "Wall-to-wall academy was major." The shift allowed for Hoover to schedule students in smaller, more consistent, yet heterogeneous groups to foster a sense of familiarity and consistency: "Students were one in 500 instead of one in 2,200. They had repeat teachers…and knew all the teachers in their academy…They could predict what class would be like, and they had a routine and friends they traveled with throughout the day." The wall-to-wall academy also allowed Hoover to ensure more demographically balanced cohorts and classes. Heterogeneously grouped students traveled together throughout the day and worked on project-based learning together. And there was intentional effort to balance academies by gender.

Hoover High's Master Scheduling Process

Hoover's core scheduling team includes Vice Principal Conti, Principal Babineau, Head Counselor Andrea Muñoz, and the counseling team. In the summer the team assembles and begins planning for the following school year. It analyzes schedule audit data from the previous year and review progress on the previous years' goals. The audit data includes information on student distribution across classes by gender, students with IEPs, ELLs. It also shows teachers' workloads by class size as well as the demographics of students they were assigned. The audit data gives the team an idea of whether the previous year's schedule met expectations.

After reviewing audit data, the team discusses goals and priorities for the upcoming schedule with academic departments and academy directors. Around February, when the counseling team wraps up the student course selection process, Vice Principal Conti begins using Abl scheduling software to build the schedule. The tool helps Conti ensure she builds an equitable and balanced schedule, "I can look at the class size, I can cohort students, evenly distribute students with IEPs and English learners, predict the conflicts." As she's working the schedule, Conti also continues to involve staff to discuss potential changes.

If needed, Conti can seek support from the district through things like master scheduling labs, where she can work on the schedule with other high school administrators or receive one-on-one coaching. By the end of the school year, Conti is able to share a draft form of the schedule with teachers and students. Over the summer, the team continues to make tweaks as enrollment and staffing change.

STAKEHOLDER ENGAGEMENT

De-tracked 9th- and 10th-grade mathematics

To ensure all students accessed challenging coursework and to address the effect tracking had on isolating students by ability and race, Hoover de-tracked mathematics in the 9th and 10th grades. Everyone now had access to the same rigorous coursework as soon as they arrived at Hoover. In addition, and growing directly out of their decision to engage teachers in the process, Hoover also did something highly unusual for a 4-by-4 block schedule: It made mathematics yearlong.

> We had conversations: What do teachers need in order to feel supported? Who has the time to bring students up to speed and believe in them and support them but then also cover standards? We listened to what they needed. A lot of it was about time, and time together, for planning and curriculum support. The following year, we agreed that all math would be yearlong as opposed to semester long, but it would also not be separated into advanced and regular.[120]

Doing so gave students time to receive the appropriate amount of instruction and support, but it also provided teachers additional time to adapt to a significant scheduling change and collaborate with one another to support students' needs. This illustrates that access goes beyond simple enrollment. It also means providing the requisite support and time for students to be supported and successful in their learning.

Increased support for course selection

Conti and Babineau also sought to reduce the information gap when it came to course selection. They revised articulation cards, the documents students use to select courses for the following year, so no matter what option or pathway students chose, they would receive access to rigorous coursework that met A–G requirements. Hibbeln had engaged in a similar effort at the district level to remove course offerings that did not meet A–G requirements and thereby reduce disparities in who had access to them. Jeffrey Thomas, an operations specialist who provided scheduling support to Conti and others in the district, spoke of the importance of structured choice for equity. "Look at choice versus structured choice.… We like to give all sorts of choices. We like to have articulation cards where they can pick any course that they want and to offer every opportunity. That's not a good thing for equity." Indeed, as Hibbeln had learned in her earlier auditing process, bloated course catalogs made it easy for students to unwittingly select courses that bumped them off the A–G track and landed them in "junk" courses that satisfied high school graduation requirements but not college admissions requirements. At Hoover, a revised version of the articulation card provided more structured choice for students and families and ensured that whatever they chose would keep them on track. Articulation cards went from being a "menu with every single course that Hoover High offers" to a single-page document with clear course sequences and A–G requirements. This helped ensure that all students, not just those with support for navigating course selection, were set up for success.

Expanded access to AP courses

Hoover increased access to A–G courses and the availability of and access to Advanced Placement (AP) courses. A partnership with Equal Opportunity Schools, an organization focused on improving equitable access to and success in academically rigorous programs, gave Hoover additional data and tools for addressing disparities in access to AP. Hoover began using multiple measures, not just grade point average, to assess readiness for AP and created lists of students to actively recruit for AP. Finishing the schedule before summer begins allows the counseling team to continue recruitment efforts until the start of school. A partnership with the National Science and Math Initiative provides financial incentives for students to receive a qualifying score on the AP exam.

In addition, Hoover holds "celebrations," events to recruit and congratulate students for their participation. Principal Babineau explained the support they provide first-time AP takers: "We have celebratory meetings for students and parents of students who have never been in an AP class.… We say, 'Hey, you've been nominated. Someone believes in you. This is what [AP] looks like, and this is why you're going to be successful.'

The combination of the district's effort to increase access to A–G eligible courses and Hoover's revisions to articulation helped produce vast improvements in the rate of students accessing A–G coursework at Hoover (Table 6). From academic year (AY) 2013–14 to 2018–19, the rate of students meeting A–G requirements went from 39.5 to 75 percent (Table 6). In addition, as a result of the use of expanded criteria for AP and intentional recruitment efforts, AP enrollment nearly tripled at Hoover (Figure 11) with near-proportionate participation based on students' race or ethnicity (Table 8).

Sustaining the commitment

Hoover's leaders have something that Hibbeln, who now supports schools across the country to schedule more strategically, refers to as commitment over compliance. Hibbeln noted that limitations emerge when even strategic scheduling becomes primarily about compliance: "We monitored really hard…but because we never shifted from compliance to commitment, people started to revert back to their old practices."

By contrast, Conti and Babineau plan to continue leveraging the schedule to ensure they're providing Hoover students equitable opportunities and access. They're hoping to offer even more dual-enrollment opportunities and to ensure students are not just enrolled in AP but supported in succeeding. They view the schedule as a critical part of achieving these aims and others, and they will continue to use it to "structurally and systematically create options for kids," Babineau said.

TABLE 6
A–G Rates at Hoover High
Students who meet A–G
requirements.

	AY 2013–14	AY 2014–15	AY 2015–16	AY 2016–17	AY 2017–18	AY 2018–19
Overall	39.5%	45.2%	55.3%	62.4%	58.9%	75%
Individualized education program (IEP)	NA	NA	NA	40%	47.4%	55.6%
ELL	4%	16.2%	15.4%	51.5%	45%	69.2%
Low income	40.7%	44.6%	55.6%	62.2%	59.1%	75.1%
Black	31.6%	32%	44.4%	68.4%	69.2%	72.2%
Latino	37.3%	44%	54.2%	58.4%	55.7%	73%
Filipino	0%	100%	**	**	**	**
Asian	54.8%	58.3%	65.4%	72.7%	72.2%	83.6%
White	37.5%	50%	75%	**	**	**
2 or more	50%	28.6%	75%	**	**	**
Races						
Female	44.9%	49%	65.1%	68.9%	63.2%	83.5%
Male	33.3%	40%	44.7%	55%	54.9%	65.4%

Source: Personal communication of anonymized information

Hoover AP Course Enrollment 2015-2018

Source: California Department of Education DataQuest

Hoover High 2017–2018 AP Enrollment by Race/Ethnicity

Category	Total School Enrollment (in %)	Students Taking at Least 1 AP Course
American Indian/ Alaskan Native	0.2%	0.2%
Asian	12%	18%
Black	9%	10%
Hispanic	75%	70%
Native Hawaiian/ Pacific Islander	0.2%	0%
Two or More	3%	2%
White	8%	0.2%

Source: Office for Civil Rights (OCR) Data Collection

Appendix C: Bibb County School District Case Study

Improving Equitable Access to Instruction and Intervention: Elementary School Scheduling in Bibb County, Georgia

Summary

CHALLENGE

In 2015 there was wide variation in the quality and breadth of learning opportunities that elementary school students received within Bibb County School District. Solely depending on the school they attended, some students were receiving as many as 50 additional minutes of instructional time in a given subject than others. In addition, students who required additional support were ultimately receiving less when schedules planned intervention time for the same time as core instruction, forcing a student to miss one in order to receive the other. Central office leaders were determined to ensure more equitable access to a consistent and sufficient set of instructional and intervention time. They did so by revising the master schedule.

STRATEGIC APPROACH TO SCHEDULING

Bibb County leaders decided to provide more centralized scheduling support for elementary school leaders by setting consistent district-wide expectations and guidelines for instructional, intervention, and enrichment time and providing opportunities for school leaders to collaborate with one another and with the district in creating their schedules.

OUTCOMES

Six years later, all elementary school students across the district receive at least 120 minutes of reading, 75 minutes of math, and 45 minutes of science and social studies each day. In addition, students in need of support receive interventions during a dedicated intervention and enrichment block.

District Profile (2017–18 School Year)[122]
Bibb County School District

24,561	Students
99.1%	Free and Reduced Price Lunch (FRPL)
2.3%	English Language Learners
10.7%	Students with disabilities
4.8%	Latino
1.7%	Asian
72.5%	Black
18.4%	White

Bibb County School District (BCSD) is a midsize school district serving about 22,000 students in Macon, Georgia.[123] For the past six years, Tanzy Kilcrease, Bibb County's assistant superintendent of teaching and learning, has supported school leaders with their master schedules. In 2015, Superintendent Dr. Curtis Jones Jr. and Kilcrease, both new to the district, began revising master scheduling in BCSD. The revision process began with an observation: There were clear disparities across the district in how schools used time to serve students. BCSD leaders set out to change that by using the master schedule to guarantee more equitable access to instruction and intervention.

Elementary schools in Bibb County rely on two main tools for scheduling: Infinite Campus, the SIS, and District Management Group's scheduling support and software.[124]

Creating equitable access to instruction and intervention

When Kilcrease joined Bibb County in 2015, scheduling and, as a consequence, the quality of learning experiences varied widely across the district. "Scheduling was left up to the schools individually," Kilcrease said. "Schools were kind of their own little systems. We were systems of several systems." As a result, rigor and opportunities for learning varied depending on the school a student attended, Kilcrease noted, "they could get a totally different learning experience based on scheduling." Some elementary schools spent 60 minutes on reading, others spent twice that amount, and still others spent somewhere in between.

In addition to inconsistent access to reading and math instruction, there was also no dedicated time set aside for interventions. Students could be pulled for interventions haphazardly and, in some instances, as core instruction was being delivered. As a result, students with IEPs and multilingual learners who were slated to receive more support actually received less. Rather than supplementing core instruction, interventions were delivered in place of core instruction, leaving students most in need of support with fewer opportunities to receive it. To ensure that students with the greatest need were able to access the fullest education possible, Bibb County leaders, in partnership with District Management Group (DMGroup), revised the schedule to prioritize this group of students. The new design carved out a separate block of time that could be used for intervention, enrichment, and teacher collaboration.

Communicating the initiative and gathering teacher perspectives

When first making the change to the schedule, Kilcrease and DMGroup representatives ensured that key stakeholders—the board of education, district leaders, school leaders, staff—were aware of and had a chance to engage in the process.

Jennifer Askew, principal of Heritage Elementary School, noted the importance of engaging stakeholders, especially teachers, at each stage of the scheduling process but especially early on. "You can't make it on your own," Askew said. "There is no way. You cannot make that schedule work without talking to your teachers." Askew recommended beginning engagement early on in the process, noting that others will "think of things you will never think of" and ultimately contribute to the design of a more effective schedule.

Kilcrease assembled a core team comprising school administrators, members of her own teaching and learning team, special education team members, and members of district effectiveness who took part in planning and implementation at each phase. The core team, in partnership with DMGroup, also developed focus groups to elicit perspectives on the schedule from teachers, paraprofessionals, and other key stakeholders.

In addition to seeking feedback from school-based staff, the central office also provided training and support to school leaders as they developed their schedules. The central office invited school leaders to meet and discuss their schedules. At these meetings, district leaders shared research undergirding scheduling guidelines, and principals used the protected time to plan their own schedules. Kilcrease noted, "It's not the central office telling them you're going to do this. It's giving them the research and…an opportunity to reflect on their current practices."

Kilcrease mentioned these meetings are especially helpful each year when new administrators join the district. Rather than assuming incoming administrators are already aware of the importance of scheduling, the central office provides targeted scheduling support and an opportunity to discuss the schedule with other school leaders.

"We always look at data. Data drives our decisions. "

TANZY KILCREASE

Surveying teachers' time to improve the schedule

DATA

As a part of their work with DMGroup, Bibb County's elementary school teachers kept a log of how they spent their time for a week. "It was just amazing to get that data," Kilcrease said. There were additional facts and figures supporting observations that instructional time varied across the district. The survey showed the number of meetings teachers attended, the amount of time spent on a particular subject, and time spent in transition. As suspected, the survey revealed variations in the amount of time spent on each subject. Some students were receiving as many as 50 more minutes in a subject than others.[125]

IMPROVEMENT

The survey results were a key piece of information that prompted the district to set instructional guidelines and rearrange the schedule to meet guidelines around time for instruction, intervention, enrichment, and teacher collaboration.

Guaranteeing equitable access to instructional time

DESIGN

One of the most significant changes to emerge from the review of scheduling data was the decision to set guidelines for instruction by subject. Rather than having wide variation among schools in the district, all elementary schools from K to 5 now include in their schedules 120 minutes of reading instruction, 75 minutes of math instruction, and at least 45 minutes each day for science and social studies.

Increasing equity through intervention and enrichment blocks

In addition to establishing guidelines for each subject, ensuring that all students have access to academic subjects on a consistent basis, Bibb County leaders also rearranged the schedule to include a separate block for intervention and enrichment time. No longer would students with IEPs and multilingual learners be pulled in the middle of much-needed core instruction and at unpredictable intervals. Instead, they had a dedicated block of time during which they could regularly and reliably receive needed support without missing out on essential core instruction.

The intervention block was also intentionally staggered to ensure that enough educators are available to provide support to students who need it. Each grade level has its own intervention time, explained Dr. Cami Hamlin, the principal of Springdale Elementary School.

"That means every extra teacher who's not a homeroom teacher can support that grade level during that intervention time." Before the guidelines, Hamlin and her team kept students after school to provide intervention. So she welcomed the district's new guidelines, which allowed her to fit the intervention block within the standard day: "It was nice when the whole district required us to schedule intervention when we started using DMG[roup]."

Principal Askew also appreciated the addition of the intervention block. "I would not be able to do what I do for my children and my staff without it," she said. Yet, like Hamlin, she hadn't figured out how to add a designated time for intervention without adding time to the schedule. "I thought I knew the schedule inside and out," Askew said, so it was a welcome change when [DMGroup] "managed to squeeze in intervention…without changing the hours in the day."

❝[The schedule] is a powerful lever. It's going to catapult students to the next level. Really and truly, without an effective master schedule, you're not going to get the results that you need or want. It is one of the most important operational things schools can do to ensure equitable outcomes for students, and it's one we all have control over. That's what's so amazing. It's not out of our control. ❞

TANZY KILCREASE

RESULTS

In walkthroughs the following year, over 90 percent of teachers were following the instructional guidelines. Students across the district were receiving more equitable and consistent access to core content while also receiving access to interventions and support.[126] The district-wide consistency in instruction and intervention time was a direct result of a more strategic approach to scheduling. Kilcrease noted the immense opportunity within the schedule to increase students' access to equitable learning opportunities. "There's a lot that can be done [through the schedule], and it is not that hard," Kilcrease said. However, doing so does require schools and districts to act affirmatively, "It has to be intentional," Kilcrease added. "It's intentional work."

CONCLUSION

With the right tools and data and a commitment to equity, Bibb County transformed its scheduling system in just a few years. Schools across the district receive centralized scheduling support and guidance that helps them afford students, particularly those in need of greater supports, more equitable access to learning across the district. Before the scheduling process was revised, schools "were doing their own thing," Kilcrease said. "But now we're all striving to do the same thing."

Appendix D: Master Scheduling Self-assessment

A Self-assessment for Strategic Master Scheduling

What: This self-assessment tool is based on the Master Scheduling Equity Framework. The assessment is organized around the four domains of strategic scheduling: project management, stakeholder engagement, improvement, and design. Alongside each practice are two checkboxes. The first, labeled "active," indicates that the listed practice is already in place. The second, labeled "priority," indicates that the practice is not in place but the team would like to add it, or that it is in place but the team would like to focus on improving it.

Who: School-based scheduling teams and district-level staff who support scheduling.

Why: The purpose of the tool is to give scheduling teams an opportunity to reflect on their master scheduling practices and identify areas for improvement. Are all domains represented in the process? Which would benefit from more attention and development?

When: The self-assessment is best completed at the beginning or end of a scheduling cycle as a way to reflect on the previous cycle and plan for the upcoming one.

How to use this tool?

1. Identify existing practices

   – Read each checklist item and check "active" for all that are part of your scheduling team's process.

2. Identify priorities

   – Review your answers, and identify areas of scheduling to focus on as priorities. To determine priorities, consider the following questions:

     • What practices most closely address an urgent or ongoing challenge?

     • What practices can be adapted or adjusted on a shorter timeline? Which require a longer timeline?

     • Which practices need to be in place before other practices can be adopted?

     • Which elements are interdependent?

     • Which practices have been identified as priorities by stakeholders (e.g., staff, students, families)?

Self-Assessment: Strategic Master Scheduling

Project management	Active	Priority
The master scheduling timeline accounts for the timing of other strategic decisions (e.g., budgeting and staffing) and includes sufficient time to complete all phases of scheduling.	☐	☐
The scheduling team shares a draft master schedule for the upcoming school year with staff before the current school year ends.	☐	☐
Scheduling is team based, and the principal is an active member of the core scheduling team.	☐	☐
The scheduling team receives formal training on master scheduling, both on its technical aspects and its implications for equitable student access to opportunity.	☐	☐
System-level actors convene scheduling teams to collaborate, review audit data, and spend protected time on the master schedule.	☐	☐

Stakeholder engagement	Active	Priority
The scheduling team engages staff, students, and families in the scheduling process by conducting surveys, focus groups, and other conversations to understand their perspectives on and experiences with the master schedule.	☐	☐
The scheduling team engages a broader set of staff members in supporting the planning, design, and revision of the schedule.	☐	☐
The scheduling team shares key data with school staff to build understanding and buy-in for changes to the master schedule.	☐	☐

Improvement	Active	Priority
The district- and school-based scheduling team regularly (at least annually) audits schedules, transcripts, and general use of time to surface areas for improvement.	☐	☐
System-level actors establish and share guidelines and expectations for expanding access and opportunity through the schedule.	☐	☐
The scheduling team sets scheduling priorities and goals based on the results of audits and stakeholder feedback, goals should be specific about improvements expected for marginalized students' access and opportunity.	☐	☐
The scheduling team revises the master schedule as needed to align with scheduling goals and priorities.	☐	☐

Design	Active	Priority
The scheduling team prioritizes students' essential learning needs by building the schedule around those needs (in many instances, this means the priorities get scheduled first).	☐	☐
The scheduling team adopts a bell schedule and method of grouping and dividing students (e.g., teaming, cohorts, academies) in a way that maximizes learning and access to learning opportunities.	☐	☐
The scheduling team works in collaboration with other staff members (e.g., the counseling team) to remove "gatekeepers," which disproportionately exclude marginalized students.	☐	☐

Data, tools, and a commitment to equity	Active	Priority
The scheduling team regularly views data disaggregated by student subgroups and uses it to inform scheduling designs.	☐	☐
The scheduling team has access to user-friendly tools that let it effectively assess the impact of the schedule on students' access and opportunity.	☐	☐
The scheduling team has access to user-friendly tools that let it effectively and efficiently create a schedule that maximizes student access and opportunity.	☐	☐
The scheduling team intentionally and continually seeks out and addresses structural barriers and conditions that disproportionately affect marginalized students' ability to access learning.	☐	☐

Endnotes:

[1] Bryk, A. S., Sebring, P. B., Allensworth, E., Easton, J. Q., & Luppescu, S. (2006). *The Essential Supports for School Improvement.* University of Chicago Consortium on School Research. https://consortium.uchicago.edu/publications/essential-supports-school-improvement

[2] *What Does Your School Schedule Say About Equity? More Than You Think. - EdSurge News.* (2019, April 20). EdSurge. https://www.edsurge.com/news/2019-04-20-what-does-your-school-schedule-say-about-equity-more-than-you-think

[3] *The 10th Annual AP Report to the Nation.* (2014). The College Board. https://secure-media.college-board.org/digitalServices/pdf/ap/rtn/10th-annual/10th-annual-ap-report-to-the-nation-single-page.pdf

[4] Demetra Kalogrides, Susanna Loeb, Tara Beteille, "Systematic Sorting: Teacher Characteristics and Class Assignments," *Sociology of Education* 86, no. 2 (2013): 103–123.

[5] "Resource Guide for Elementary Master Scheduling" (Montgomery County Public Schools, 2009), https://www.montgomeryschoolsmd.org/uploadedFiles/curriculum/finearts/staff/ES%20master-scheduling%20guide.pdf. "Master Schedule Guide" (College and Career Academy Support Network), https://casn.berkeley.edu/master-schedule-guide/master-schedule-guide-stage-3-building-the-schedule/. "A Guide to Building a Secondary Master Schedule—Process and Policy" (MiSiS Master Scheduling Team & Division of Instruction, 2017), https://achieve.lausd.net/site/handlers/filedownload.ashx?moduleinstanceid=21085&dataid=22158&FileName=Master%20Schedule%20Building%20on%20MiSiS%20040717.pdf.

[6] In all but three cases, schedulers were also school leaders or teachers. Accordingly, a tally of the right column will total 39, which is more than the 36 who were interviewed.

[7] "You have limited resources. You can't have a teacher in three places at once.… I feel like almost everyone described it as a puzzle with lots of pieces that have to fit in perfectly.… It's just a lot of moving pieces, and every school wants to serve each student. But it can become very difficult to do that with limited time and resources and staff." —researcher, 7/29/20

"It's kind of like keeping a 30,000-piece puzzle in your head at all times." —principal, 10/22/20

[8] "The contract says that teachers can't be required to teach four consecutive periods, and certain classes meet for double periods. [We're] trying to keep those double periods together as much as possible so that you actually get that long block in. All those teachers have duties, but they have to have an unassigned period every day. All those different pieces fitting together tends to be what drives what is and isn't possible." —teacher and scheduler, 10/28/20

[9] "As far as labor laws are concerned, we can give the teachers only a certain amount of preparation. We can give them only like two or three preps at a time. We have to make sure that their classes are at 30 to 35 [students]. They can't have 45 people in the class. —assistant principal and scheduler, 10/22/20

"If you teach for too many periods in a row, it's considered a violation of our contract, and I believe you can't be teaching for more than three periods in a row. Then you have to have…a prep period." —special education teacher, 10/26/20

[10] "The problem you have is that the school system changes its philosophy sometimes, and a lot of times that philosophy comes from the state. For instance, one of the things they're implementing next year is financial literacy. We're teaching it this year because it's going to become a graduation requirement for next year. But that means that now our schedule is going to change because we have to add financial literacy into our math schedule. We've got to find somewhere to put the teacher because we may not have enough classroom space available." —assistant principal and scheduler, 10/22/20

[11] "We have like a recess law in [our state]. For elementary, they need a certain amount of recess like unstructured, free play. So we have to set up our master schedule to be sure they're getting that." — school leader, 10/30/20

[12] Emily Brixey, "50-State Comparison: Instructional Time Policies" (Education Commission of the States, 2020); https://www.ecs.org/50-state-comparison-instructional-time-policies.

[13] "Academics should set the bell schedule. In our district of 20,000 students, the bus schedule sets when you start." —district leader, 10/15/20

[14] "We have to make sure we have certain instructional minutes, that we have certain programs in place that all students have access to—like the arts—and that we have 100 minutes of phys ed. There are a lot of requirements that are in place that we didn't establish but that are established at the state level." —assistant superintendent, 10/8/20

[15] Brixey, "50-State Comparison."

[16] "For special ed, law really is the biggest limitation on what works in the schedule. Our school is about 30 percent students with IEPs, which is really high.… In [a special education] classroom, you can't have more than 12 students with an IEP, and you can't have more than 40 percent of the total population of students in a class have IEPs. Those two things are really the biggest limitation in making a schedule. It leads to some really ridiculous outcomes: I might have a non-ICT [integrated co-teaching] science section of 12 kids, because I if I have 24 kids in a grade who need ICT science, which is normal in my school, there have to be two sections—12 in one section, 12 in another. To get to the 40:60 ratio, I must have 18 kids who don't have IEPs in that section. Then makes these ridiculous things: I have these tiny gen ed sections that have to exist to be compliant with state law." —academic dean and scheduler, 8/5

[17] "At the end of the day, it's a super-complex puzzle that I'm just trying to make. It's hard to do. There's only so much, and it's so complex. There are so many variables." —teacher and scheduler, 8/5/20

[18] Personal communication, 8/5/20

[19] "[Scheduling is] really a full-time job for any high school. For any high school, I don't care where it is or who it is, it's a full-time job." —assistant principal and scheduler, 10/22/20

[20] Personal communication, teacher and scheduler, 10/26
[21] Personal communication, 10/28/20

[22] "You have limited resources. You can't have a teacher in three places at once.… Almost everyone described it as a puzzle with lots of pieces that have to fit in perfectly.… It's just a lot of moving pieces. Every school wants to serve each student, but it can become very difficult to do that with limited time and resources and staff." —researcher, 7/29/20

[23] Personal communication, 11/11/20

[24] Personal communication, 11/11/20; Shifrer, D., Callahan, R. M., & Muller, C. (2013). Equity or Marginalization?: The High School Course-Taking of Students Labeled With a Learning Disability.

American Educational Research Journal, 50(4), 656–682. https://doi.org/10.3102/0002831213479439

[25] Personal communication, 7/11/20

[26] Dara Shifrer, Rebecca M. Callahan, and Chandra Muller, "Equity or Marginalization?: The High School Course-Taking of Students Labeled With a Learning Disability," *American Educational Research Journal* 50, no. 4 (2013): 656–682; https://doi.org/10.3102/0002831213479439. Demetra Kalogrides and Susanna Loeb, "Different Teachers, Different Peers: The Magnitude of Student Sorting Within Schools," *Educational Researcher* 42, no. 6 (2013): 304–316; https://doi.org/10.3102/0013189X13495087. Sophie Quinton, "The Race Gap in High School Honors Classes," *The Atlantic*, December 11, 2014; https://www.theatlantic.com/politics/archive/2014/12/the-race-gap-in-high-school-honors-classes/431751/.

[27] "A Policy Framework for Tomorrow's Learning" (Partnership for the Future of Learning, 2017), https://futureforlearning.org/wp-content/uploads/2019/04/PFL-policy-framework.pdf.

[28] "I remember walking into that [advanced math] class. Our school was 70 percent Hispanic and Black. And I walked into that class, and almost every face that was looking at me was white or Asian. It was so noticeable to me. But when we program the kids, we had no choice but to move them forward into advanced math because they had already passed the high school requirement in middle school. As we started to dig in to what was going on, we found out from multiple kids and multiple teachers in the middle schools that they had programmed kids into these classes. But they only let the good classes—and those are their words, 'good classes'—take the regents to get credit for high school. If you were in the bad class—again, not meaning that you weren't smart enough to do it, but it wound up meaning that you were noisy in class, you didn't listen to the teacher—those kids were not allowed to take the exam even if they were qualified. Because that's the way they were passed to me on the high school level, we had no choice but to continue that segregation of the students into high school.

"It really is something that follows the kids all the way through every school because I can't make them take the same class again. That's terrible for them, and you wind up with the kids who were in that first—what we called math B at the time. Kids who were in that first math B class had the option to go all the way through calculus—math B precalculus to really prep them and then AP calculus, where the kids who didn't get to take that class because they were 'bad' either had to stop at precalculus or wind up not being prepared and going into AP calc with a disadvantage." —high school program chair, 7/10/20

[29] Study of "opportunity hoarding" within an integrated suburban district found that white parents acted in a way that contributed to the maintenance of racial separation within the school: "School personnel described the pressure they felt from middle-class white parents not to change anything about the tracking system or any of the related practices that currently created and/or reinforced white students' advantages." Amanda E. Lewis and John B. Diamond, Despite the *Best Intentions: How Racial Inequality Thrives in Good Schools* (New York: Oxford University Press, 2015), 135. Cathy Cohen and Frederick Harris, eds., *Transgressing Boundaries: Studies in Black Politics and Black Communities* (New York: Oxford University Press). Kalogrides and Loeb, "Different Teachers, Different Peers."

[30] "One of the African American teachers who was in my department said, 'You watch. The master schedule is used to separate kids in this school. Watch it.'... I was a teacher, and I saw my regular classes were predominantly Black, my honors were predominantly white. I went on to teach an AP class—predominantly white." —district leader, 10/15/20

"The band classes tended to be mostly…the white and Chinese kids and very few students of color.… If you look at who was getting whittled out, it was the problem kids. And the problem, kids in their minds, were the Black and brown kids.… The numbers don't lie." —teacher and scheduler, 10/28/20

[31] "We have been working grade by grade, subject area by subject area, to eliminate those [tracked] classes in the other areas because the master schedule, although it was intended to support these students by giving them a small-class option, was actually putting them in a track that gave them inferior results or lower achievement scores or even self-confidence issues." —district leader, 10/8/20

[32] Kalogrides and Loeb, "Different Teachers, Different Peers." MK Finley, "Teachers and tracking in a comprehensive high school," *Sociology of Education* 57, no. 4 (1984), 233–243.

[33] Carver-Thomas, D. & Darling-Hammond, L. (2017). Teacher turnover: Why it matters and what we can do about it. Palo Alto, CA: Learning Policy Institute. https://learningpolicyinstitute.org/product/teacher-turnover.

[34] Paul Bruno, Sarah Rabovsky, and Katharine Strunk, *Taking their First Steps: The Distribution of New Teachers Into School and Classroom Contexts and Implications for Teacher Effectiveness and Growth* (National Center for Analysis of Longitudinal Data in Education Research, 2019).

[35] "How are you using the teachers who are not certified and those who are certified?… The Honors teachers were always your crème de la crème teachers. We spent years saying they need to teach the regular Algebra 1.… We still have a lot of work in that area. —district leader, 10/15/20

[36] "Finding America's Missing AP and IB Students" (The Education Trust, 2013); https://edtrust.org/wp-content/uploads/2013/10/Missing_Students.pdf.

[37] Brian P. An and Jason L. Taylor, "A Review of Empirical Studies on Dual Enrollment: Assessing Educational Outcomes," in *Higher Education: Handbook of Theory and Research*, edited by M. B. Paulsen and L. W. Pena (2019), 99–151; http://www.nacep.org/docs/briefs/An%20%26%20Taylor%20%282019%29.pdf.

[38] Di Xu, Sabrina Solanki, and John Fink, "College Acceleration for All? Mapping Racial Gaps in Advanced Placement and Dual Enrollment Participation" *American Educational Research Journal*, March 3, 2021; https://doi.org/10.3102/0002831221991138. "Advanced Placement: Model Policy Components" (Education Commission of the States, 2016); https://www.ecs.org/wp-content/uploads/AP-Model-Policy-Components.pdf. "College and Career Pathways: Equity in Access" (ExcelInEd, 2018); https://www.excelined.org/wp-content/uploads/2018/10/ExcelinEd.Report.CollegeCareerPathways.CRDCAnalysis.Slides.2018.pdf.

[39] "Finding America's Missing AP and IB Students."

[40] "The 10th Annual AP Report to the Nation"

[41] Ibid.

[42] "College Acceleration for All?" "Advanced Placement: Model Policy Components." "College and Career Pathways: Equity in Access."

[43] Rashea Hamilton, et al., "Disentangling the Roles of Institutional and Individual Poverty in the Identification of Gifted Students," *Gifted Child Quarterly* 62, no. 1 (2018); https://journals.sagepub.com/doi/abs/10.1177/0016986217738053. David Card and Laura Giuliano, "Universal Screening Increases the Representation of Low-Income and Minority Students in Gifted Education," PNAS 113, No. 48 (2016): 13678–13683, https://www.pnas.org/content/113/48/13678.

[44] Yasmin Irizarry, "On Track or Derailed? Race, Advanced Math, and the Transition to High School," *Socius: Sociological Research for a Dynamic World*, January 11, 2021; https://doi.org/10.1177/2378023120980293.

45 "CPS Equity Framework: Creating and Sustaining Equity at the Individual, School, and District Level" (Chicago Public Schools, 2020); https://www.cps.edu/globalassets/cps-pages/about/departments/office-of-equity/equity-framework.pdf.

46 Personal communication, 11/11/20. UC A–G refers to the course completion requirements that entering freshmen must meet to attend the University of California (UC) and California State University (CSU). Each subject area is assigned a letter (e.g., A. History, B. English), which is why these are referred to as A–G requirements. There is a formal approval process to have a course approved as meeting A–G requirements. https://www.ousd.org/domain/1724

47 Personal communication, 11/17/20.

48 Personal communication, 11/11/20.

49 Personal communication, 11/11/20

50 "It's tough to get them to see…how a French class can possibly be racist. Well, look who's in the French class. Look who's asking for it, and look at what the effects of having that class are." — school site operations specialist, 11/17/20

51 "Victory in Progress: 2019 Annual Report" (Bibb County School District, 2020); https://www.bcsdk12.net/UserFiles/Servers/Server_1736137/File/About%20Us/Annual%20Report/Annual%20Report%2020190924.pdf.

52 Kathleen Choi and Tess Nicholson, "Raising Achievement and Addressing Equity at Bibb County School District (GA)," *District Management Journal 23* (2018); https://cdn2.hubspot.net/hubfs/3412255/DMJ23-Raising-Achievement-and-Addressing-Equity-at-Bibb-County-Schools-GA.pdf. Personal communication, principal, 2/9/21

53 Personal communication, 2/9/21

54 "It's very clunky. It's very time-consuming. It's not a great tool. It's the tool we have.… It is fully integrated in our SIS, though. So the one advantage of it is that all our students and their historical needs are in there in terms of do they need IEP services? Do they need to work with an EL [English language] teacher in a small group?" —district leader 10/8/20

55 Personal communication, 2/12/21

56 Personal communication, 11/17/20

57 Online Student Profile System 4.0 User Manual v4 retrieved at: https://osps.sandi.net/osps4/

58 Abl; https://www.ablschools.com.

59 "I don't think people are doing it maliciously. They're tired. They have huge caseloads.… But if you have another set of eyes that come through and take a look at it, and say, 'Wait a minute, did you notice that this kid has English 2 but never had English 1?' Our PowerSchool doesn't have tools to catch that. You can't run a report that says, 'Tell me which pairs aren't complete.' You can't really run a report that tells me which ones are out of order. They catch it when somebody else catches it. The kid comes in and says, 'I didn't have this class.' Or the teacher notices it, or a counselor happens to notice one day when they're flipping through the book. But it could be October or November by that time." —personal communication, 11/17/20

60 "The best part about DMG is being able to set your time limits ahead of time. Because sometimes in the old way, you would say, 'I'm gonna make this work. We're supposed to have 90 [minutes], but this is only 80. I'm just gonna do it.' That's not good. Kids need that time." —personal communication, 2/12/21

[61] Personal communication 10/8; personal communication, 8/5/20

[62] "District Management Group helps school district leaders combine the most effective educational best practices with proven management techniques to bring about measurable, sustainable improvements in student outcomes"; https://www.dmgroupk12.com

[63] Personal communication, 2/12/21

[64] Dr. Cami Hamlin, principal, Springdale Elementary School

[65] Personal communication, 2/12/21

[66] Personal communication, 2/12/21

[67] Personal communication, 2/12/21

[68] You could actually print a schedule for just specials teachers, print a schedule for just the interventionist, print a schedule for each grade level." —personal communication, 2/12/21

[69] Tanzy Kilcrease, assistant superintendent of teaching and learning, Bibb County School District

[70] "They had to spend an entire week recording what it was that they were doing. And that data was it was just astronomical, seeing what it is that our teachers actually were doing and how many meetings they were in, how many minutes they were spending on this particular subject, or how many minutes they were spending with transitions. It was just amazing to get that data." —Tanzy Kilcrease

[71] Choi and Nicholson, "Raising Achievement and Addressing Equity."

[72] Diane Conti, vice principal, Herbert Hoover High School

[73] Personal communication, 11/16/20

[74] Personal communication, 11/16/20

[75] "What is your data telling you? How can you disrupt that data with a change in the master schedule? Can you include a pathway? Can you do this? Can you do that? There was a lot of setting up those questions and then table time for them to work." —Jeffrey Thomas

[76] "They could work uninterrupted to have those deep conversations about the schedule. You can't have them on the site. There's always a fight breaking out, some kids throwing up someplace, a parent's mad, or it's lunchtime—you got to go out to supervision. The conversations we had...were some of the best conversations because they could let go of all the other stuff and start thinking about one task." —Jeffrey Thomas

[77] Hoover High shares what classes they would be assigned but not the teacher or period. While things naturally shift over the summer, sharing in advance has the benefit of giving staff and students time to give feedback and the counseling time to redouble recruitment to balance certain courses.

[78] Keller Independent School District; https://www.kellerisd.net/Page/6575

[79] "Have a team of people who work on the master schedule and who are assigned specific roles that are clear to them. For example, we have an AP coordinator. While people have lanes that they work in, that's more for accountability. To get this done, a lot of this work is shared. Set clear expectations and rules with outcomes and deadlines." —Diane Conti

[80] "It takes a lot to change your schedule. Let's say you've been teaching an ELA course for 15 years in a 45-minute period and then you're asked to switch and teach a 75-minute period, you would have to change your whole pacing of the course and how you're going to fill that time. That's a lot of time to be with one group of students. You really have to change your teaching style. You can't just retrofit your lesson plans and your curriculum into doubling your amount of time you're with students. I

think you have to have teachers on board who are willing, if needed, to make bigger changes to how they teach. That can definitely be a challenge." —researcher, 7/29/20

[81] Keller Independent School District; https://www.kellerisd.net/Page/6575

[82] Leslee Shepherd, Executive Director of Student Advancement, Keller Independent School District

[83] "We decided one thing was the wall-to-wall academy model—the smaller learning communities—which provided familiarity. Students were one in 500 instead of one in 2,200. They had repeat teachers…and knew all the teachers in their academy. They could predict what class would be like, and they had a routine and friends they traveled with throughout the day. Wall-to-wall academy was major." —Diane Conti

[84] Personal communication, 10/28/20

[85] Personal communication, 2/24/21

[86] Personal communication, 2/24/21

[87] Hoover High also used a continuous improvement practice when budgeting: "I'm being really strategic. We're a Title I school. We have a cushion of funds that we can use to add teachers. When it comes to our Title I budget, we're being really strategic with what teachers we add and having a purpose of why we're adding them. For example…we're going to make Integrated 1 and Integrated 2 math priorities, they're going to be yearlong. And that's more expensive, right? You need to hire more teachers to make that happen. Within Title I, we're having conversations with our school site council, having conversations with our math department, and having conversations with our department leads and academy directors about a priority that we have, and then we're leveraging those funds based on data to directly meet the needs of our students. It's something that is crucial. In short, [we're making] data-based decisions and leveraging funds to meet the needs of students based on the data." —Jason Babineau

[88] Personal communication, 10/8/20

[89] Personal communication, 11/16/20

[90] "It can be a completely isolated process.… You could have the vice principals do it all. They could be the ones who do the entire process without input from anybody else. I think that is the least successful way to build a schedule. But I have seen schools where it really is when one person in an office and with a computer. That is hard." —deputy superintendent, 11/2/20

[91] A 2018 survey of elementary schools' scheduling practices conducted by District Management Group, a scheduling software and consulting provider, found that 13 percent of schools start the scheduling process before budget season and 55 percent begin in the late summer, severely limiting schools' ability to maximally align these three strategic processes. "2018 Elementary School Scheduling Survey" (District Management Group); https://info.dmgroupk12.com/scheduling-study.

[92] "Master Schedule Guide," by the University of California, Berkeley College & Career Academy Support Network (CCASN), recommends a 15-month master scheduling timeline, with schools beginning to plan for the next school year during the summer a year in advance; https://casn.berkeley.edu/master-schedule-guide

[93] "2018 Elementary School Scheduling Survey Findings" (District Management Group); https://info.dmgroupk12.com/scheduling-study.

[94] See the scheduling provider landscape analysis for additional information about available resources.
[95] "Finding America's Missing AP and IB Students."

96 "Embracing Equity: Race Equity and Inclusion Action Guide," the Annie E. Casey Foundation (2014); https://www.aecf.org/m/resourcedoc/AECF_EmbracingEquity7Steps-2014.pdf#page=12.

97 "Racial Equity Tools," Center for Assessment and Policy Development (2013), https://drive.google.com/file/d/1KNn_iuGDGi5Nn2tSneBRuJ7ExGBIrlcP/view.

98 Lewis and Diamond, *Despite the Best Intentions*.

99 "Advocacy and Outreach Guide," (Equal Opportunity Schools); https://eoschools.org/wp-content/uploads/2018/12/2018-19-EOS_Advocacy-and-Outreach-Guide.pdf. Lisa Farnham, "Helping Teachers Close the Classroom Equity Gap" (Equal Opportunity Schools, 2019); https://www.bridgespan.org/bridgespan/Images/articles/equal-opportunity-schools-close-classroom-gap/equal-opportunity-schools-case-study.pdf.

100 "Finding America's Missing AP and IB Students."

101 Irizarry, "On Track or Derailed?"

102 "Finding America's Missing AP and IB Students."

103 Ibid.

104 Irizarry, "On Track or Derailed?"

105 SS Yonezawa, "Unpacking the Black Box of Tracking Decisions: Critical Tales of Families Navigating the Course Placement Process," in *Schooling Students Placed at Risk: Research, Policy, and Practice in the Education of Poor and Minority Adolescents* (Mahwah, New Jersey: Lawrence Erlbaum Associates, 2000), 109–137.

106 Ronald Hawkins, "The Relationship Between Teacher-Student Assignment and High School Student Equity in One North Carolina School District." PhD diss., University of North Carolina at Chapel Hill, 2017. Yonezawa, "Unpacking the Black Box of Tracking Decisions."

107 Carolyn Sattin-Bajaj and Allison Roda, "Opportunity Hoarding in School Choice Contexts: The Role of Policy Design in Promoting Middle-Class Parents' Exclusionary Behaviors," *Educational Policy 34*, no. 7 (2020), 992–1035; https://doi.org/10.1177/0895904818802106. Kalogrides and Loeb, "Different Teachers, Different Peers."

108 Lewis and Diamond, *Despite the Best Intentions*.

109 Personal communication, 2/24/21

110 "I created the Remote Learning Committee. I had the departments nominate their spokesperson. I then had students from my input committee who would be part of my meetings as well. Then we had the administration and certain people from each department on the Remote Learning Committee, and we as a team discussed what we thought would be the best option based on the feedback we were getting from parents and students. We quickly moved to the schedule that we created, when we found out that we were not going back to schools. That schedule that we had created went back and forth a few times before we finally kept it." —principal, 7/23/20

111 "We created a rotating schedule so kids would have art for this number of weeks, and then they would have music. That was something we had never done before because we wanted the kids to have a variety all year. But for safety reasons, we did change that model." —district leader, 10/8/20

112 Principal 7/11/20

113 " I'd like to...structure my day without having to have a vote to make it happen. Without having

to have a SBO [school-based option] vote, or a majority, 55 percent of your teachers have to agree to this." —principal, 7/23/20

[114] Personal communication, 10/30/20

[115] Service Provider 7/10/20

[116] "This is crazy. I'm scared to say this aloud, but today we made three calendar options, and one of them is year-round.… I know it's probably not going to go anywhere because…it's too hot to be in school in the summer and all that, but this is what COVID did for us." —district leader, 10/15/20

[117] "We have college courses on our on our campuses, but they have to be at 36 [students]. It's hard for [two schools in the district]. They can't get 36 kids to take a college course. But [if one school] could get 15, [the other school] can get 20 to 21. Instead of having two sets of kids who can't take a class because they don't have enough kids, now—because of COVID—we've convinced them to combine them. Now two schools are getting the benefit when there would have been none." —school site operations specialist, 11/17/20

[118] "We have seen that one of the positives that's come out of this remote learning—and training our teachers to do it—is that we can better address other medical reasons for kids not being at school, outside COVID, that we weren't utilizing before." —district leader, 10/22/20

[119] Diane Conti, vice principal, Herbert Hoover High

[120] Diane Conti, vice principal, Herbert Hoover High

[121] Kathleen Choi and Tess Nicholson, "Raising Achievement and Addressing Equity at Bibb County School District (GA)," *District Management Journal* 23 (2018); https://cdn2.hubspot.net/hubfs/3412255/DMJ23-Raising-Achievement-and-Addressing-Equity-at-Bibb-County-Schools-GA.pdf.

[122] Civil Rights Data Collection (accessed March 10, 2021), https://ocrdata.ed.gov/profile/9/district/28853/summary.

[123] "Victory in Progress: 2019 Annual Report" (Bibb County School District, 2020); https://www.bcsdk12.net/UserFiles/Servers/Server_1736137/File/About%20Us/Annual%20Report/Annual%20Report%2020190924.pdf.

[124] District Management Group is an organization that supports districts in making systems-level change that improves students' academic and performance outcomes, https://www.dmgroupk12.com.

[125] Kathleen Choi and Tess Nicholson, "Raising Achievement and Addressing Equity at Bibb County School District (GA)," *District Management Journal* 23 (2018); https://cdn2.hubspot.net/hubfs/3412255/DMJ23-Raising-Achievement-and-Addressing-Equity-at-Bibb-County-Schools-GA.pdf.

[126] Kathleen Choi and Tess Nicholson, "Raising Achievement and Addressing Equity at Bibb County School District (GA)," *District Management Journal* 23 (2018); https://cdn2.hubspot.net/hubfs/3412255/DMJ23-Raising-Achievement-and-Addressing-Equity-at-Bibb-County-Schools-GA.pdf.