ANNENBERG
BROWN UNIVERSITY

EdWorkingPaper No. 23-718

The Cobb Teaching & Learning System: An Initiative that Advances Educator Collaboration, Transformative Technology, and Real-Time Data Utilization

Kenneth K. Wong
Brown University

Spencer Davis
Brown University

The Cobb Teaching & Learning System (CTLS) is a digital learning initiative developed for and by the Cobb County School District (CCSD) in Georgia. CTLS became a crucial initiative used by the district to maintain student academic progress during the COVID-19 pandemic. Adopting a mixed-methods approach, this case study seeks to analyze CTLS's design and implementation, focusing on digital transformation and professional collaboration within CCSD. This case study highlights how CCSD maintains complete ownership in a customized digital learning initiative supported by technology providers.

CTLS's success comes from its strategic partnership with external technology providers, most notably EdIncites, commitment to professional collaboration, investment in novel technologies, and focus on real-time data. Looking at district-by-district comparisons, Cobb's level of achievement and learning recovery resembles that of higher performing suburban districts in Georgia as opposed to its closest geographically and demographically comparable peers. Furthermore, 2019-2022 testing data indicates that all GA Milestone End-Of-Course proficiency percentages have already exceeded a 2014 baseline. This suggests that CTLS played a central role in CCSD's successful recovery after the COVID-19 pandemic.

The overall response to the digital learning initiative from the end users that it is intended to serve has also been overwhelmingly positive. The initiative is now well-positioned to broaden learning opportunities across all schools and improve communication with parents and other stakeholders. CCSD's experience in scaling CTLS offers useful lessons for districts that are ready to launch and to own their transformative digital learning environment.

VERSION: February 2023

Suggested citation: Wong, Kenneth K., and Spencer Davis. (2023). The Cobb Teaching & Learning System: An Initiative that Advances Educator Collaboration, Transformative Technology, and Real-Time Data Utilization. (EdWorkingPaper: 23-718). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/e2yq-9m26

The Cobb Teaching & Learning System:

An Initiative that Advances Educator Collaboration, Transformative Technology, and Real-Time Data Utilization

2/12/2023

Kenneth Wong, Professor, Brown University

Spencer Davis, Graduate of Urban Education Policy, Brown University

Kenneth Wong is Annenberg Professor and Director of Urban Education Policy Program at Brown University. Spencer Davis is a graduate of the master's program in Urban Education Policy Program at Brown University. The authors acknowledged the support provided by the Cobb County School District and the Acceleration Academies in conducting the research. The authors greatly appreciated the time given to the research team by teachers, parents, school and district administrators, and service providers.

Table Of Contents:

Executive Summary:

The Cobb Teaching & Learning System (CTLS) is a digital learning initiative developed *for and by* the Cobb County School District (CCSD) in Georgia. CTLS became a crucial initiative used by the district to maintain student academic progress during the COVID-19 pandemic. Adopting a mixed-methods approach, this case study seeks to analyze CTLS's design and implementation, focusing on digital transformation and professional collaboration within CCSD. This case study highlights how CCSD maintains complete ownership in a customized digital learning initiative supported by technology providers.

CTLS's success comes from its strategic partnership with external technology providers, most notably *EdIncites*, commitment to professional collaboration, investment in novel technologies, and focus on real-time data. Looking at district-by-district comparisons, Cobb's level of achievement and learning recovery resembles that of higher performing suburban districts in Georgia as opposed to its closest geographically and demographically comparable peers. Furthermore, 2019-2022 testing data indicates that all GA Milestone End-Of-Course proficiency percentages have already exceeded a 2014 baseline. This suggests that CTLS played a central role in CCSD's successful recovery after the COVID-19 pandemic.

The overall response to the digital learning initiative from the end users that it is intended to serve has also been overwhelmingly positive. The initiative is now well-positioned to broaden learning opportunities across all schools and improve communication with parents and other stakeholders. CCSD's experience in scaling CTLS offers useful lessons for districts that are ready to launch and to own their transformative digital learning environment.

Part 1: Introduction: Voices from Practitioners

Educator Experiences of the Cobb Teaching & Learning System as Digital Transformation:

"These days, I can't see myself being able to teach without CTLS," a teacher offers, her 1st Grade Team colleagues at Kennesaw Elementary School nodding in agreement. The walls of the general purpose room are covered in grade-appropriate painted designs, but the space is otherwise notably empty and undecorated. This starkness isn't uncommon in underutilized post-Covid classrooms even in a large district like the Cobb County School District (CCSD), the second largest district in the State of Georgia.

"Even our first graders can use it!" another teacher chimes in. "The kids are able to navigate CTLS as young as six or seven years old!".

Another teacher candidly adds, "I feel like they do it better than I can, sometimes".

This team of classroom educators speaks as a united front, sharing clear camaraderie that is both expressed and reinforced through their use of the Cobb Teaching & Learning System (commonly called CTLS). These teachers go on to express how CTLS supports them to create and share lesson plans with each other, which has allowed them to consolidate their workload and improve their perceived classroom effectiveness. They applaud the usefulness of the new digital resource library, which enables them to find and easily utilize pre-approved content that syncs up with state-level standards. Multiple educators speak openly about the isolation and silo mentality that they experienced before the rollout of CTLS; in contrast, they enthusiastically praise the way that CTLS's resource-sharing functions, communication facilitation, and "teacher-

owned, teacher led design" have allowed them to work together as a team to more effectively serve their students.

Tritt Elementary School Principal sits at her desk behind a Zoom screen. Her office is professional and academic, expertly lit and very tidy. "I can't think of anything that they missed [in the development of CTLS]", she muses, adding later that "CTLS saved our school… well, saved a lot of our schools." When reminiscing about the educational losses of the pandemic, the principal visibly fights back tears.

As a school building leader, one of her primary jobs is parent outreach. With the addition of CTLS Parent in a previous update, she feels that she has the tools to navigate the post-Covid parental experience. She describes her increased use of CTLS for parent communication as a "Covid Keeper"- a policy started during the pandemic which is now a common practice even now that Cobb schools have mostly returned to business-as-usual. CTLS supports principals to schedule parent-teacher conferences, communicate with parents in real-time during the day, and pull analytics about parent communications (disaggregated at a student-by-student level). When it comes to parent engagement, she says, "CTLS is the best tool in the toolbox." While she is clear that CTLS can't replace principal-to-parent in-person relationships, she speaks confidently that CTLS has facilitated the growth of these relationships; during the last round of notifications for upcoming parent-teacher conferences, 75% of the students in her school had a parent sign up to attend in person, while nearly all of the rest chose to attend meetings virtually through CTLS. Only a very small fraction of parents hadn't responded yet. This is quite an accomplishment given Tritt Elementary's enrollment of over eight hundred students.

At the CCSD central office, Assistant Superintendent and Chief Strategy & Accountability Officer explain how assessment becomes a core feature of CTLS. "When you talk about assessment, you can be in the weeds, on top of the trees, or in the stratosphere," the Assistant Superintendent posits. "At its root level," the Chief Strategy & Accountability Officer elaborates, "The platform has allowed us to see individual students' strengths and weaknesses, and address them in real-time. Then, this scales up to the school and district levels."

This idea of "real-time" comes up frequently when talking about CTLS. This isn't an accident; according to the district administrators, CTLS was originally created to give students, teachers, and administrators real-time feedback. The two administrators are deeply engaged with accountability issues, and are optimistic about CTLS's ability to provide that top-level "stratospheric" view. The original goal of CTLS was to "de-silo" all of the separate sources of data within the district. The end goal of CTLS is identified as a "data portfolio of a student," which the Chief Strategy & Accountability Officer more softly characterizes as "the holistic picture of a kid." Both administrators, however, agree that this moment-by-moment snapshot of student progress is inexorably linked to the availability, interconnectedness, and speed of the district's real-time data.

Study Objectives:

The Cobb Teaching & Learning System (CTLS) is a digital learning initiative developed *for and by* the Cobb County School District (CCSD) in Georgia. While CTLS is a longstanding initiative with roots stretching back to 2014, most of Cobb County was introduced to the system as a result of the 2020 COVID-19 pandemic. CTLS became a crucial initiative used by the district to maintain student academic progress during the crisis. Now, as CCSD settles into a new

status quo, CTLS has remained an integral part of the district's instructional strategy. Complemented by CCSD's existing tools and initiatives, CTLS is used by the district to promote student achievement, increase accountability, and encourage districtwide collaboration.

This case study seeks to analyze CTLS's design and implementation as a districtwide initiative of digital transformation and professional collaboration in CCSD. We will first offer an overview of CTLS, its features, its development, and its place within CCSD's broader vision. Next, we will examine educator collaboration through various aspects of the CTLS initiative. These aspects will include its corporate partnerships, its use of a specialized team of highly trained educators as technology integration experts, and its attempts to create a teacher community of practice through CTLS. Then, we will discuss measures of student success, teacher response, parental engagement, and technological capabilities as CTLS evolves. Finally, we will discuss the ramifications of our findings and implications for further development of CTLS.

Research Design:

This case study adopts a mixed-methods approach. First, we conducted a review of the literature on digital learning tools and digital collaboration in the education sector. Second, we conducted a series of classroom observations and staff interviews. Some of these interviews and observations were conducted via Zoom, but most were conducted in person on-site in CCSD. These interviews and observations ranged from thirty minutes to an hour and a half in length, and were performed between 09/07/2022 and 11/07/2022. Observations included demonstrations of CTLS use, both in classrooms and in small group presentations with district administrators. Notes were taken during all of these interviews and observations. Third, the interview and observation notes were qualitatively analyzed using the QDA Miner Lite and

Taguette programs. That data was then exported into an Excel spreadsheet for analysis. Fourth, we used qualitative data to construct profile summaries for entities that have an active involvement in the CTLS initiative, as well as a triangulated timeline of events ranging from 2014 to the current date of 2022. Fifth, we combined the qualitative analysis data with publicly available quantitative data (including Georgia Milestone Testing scores. SAT scores, ACT scores, CCRPI scores, financial information, general & student population information, etc.) and district documents (districtwide CTLS utilization information, school-by-school CTLS utilization summaries, learning object usage frequency charts, internal management & organization information, among others) to examine CTLS's overall success up to this point.

Part 2: The Cobb Teaching and Learning System: Developing a District-Owned Systemic Initiative

Defining the Cobb Teaching & Learning System:

Cobb County School District enrolls 108,000 students and is the second most populous school district in Georgia, as well as the twenty-fifth most populous school district in the United States (CCSD, 2022-a; GreatSchools, 2022). As a large community located in the Greater Atlanta Metro Area, Cobb County is home to an economically, racially, and culturally diverse population; 35% of students are white, 31% are Black, and 24% are Hispanic, with 28% of students identified as economically disadvantaged. CCSD is the single largest employer in Cobb, with just under 18,000 employees including around 7,500 General Education & Special Education teachers and 1,300 paraprofessionals. CCSD's student to teacher ratio is 18:1, which is higher than the state's 15:1 average but remains lower than some comparable metro areas,

With its 112 schools, CCSD serves this large heterogeneous community by providing tailored instruction for a wide range of student needs, and ensuring accountability for those entrusted to impart this differentiated education. Cobb's student population is (CCSD, 2022-a).

In 2014, recently-appointed District Superintendent Chris Ragsdale spearheaded an initiative called the Cobb Teaching & Learning System. In the simplest sense, CTLS is a particularly mission-crafted modern digital learning system (DLS), with a number of innovations and improvements. In essence, CTLS is the instrumental arm of a districtwide cultural shift towards professional collaboration and integration of teaching and learning components within CCSD.

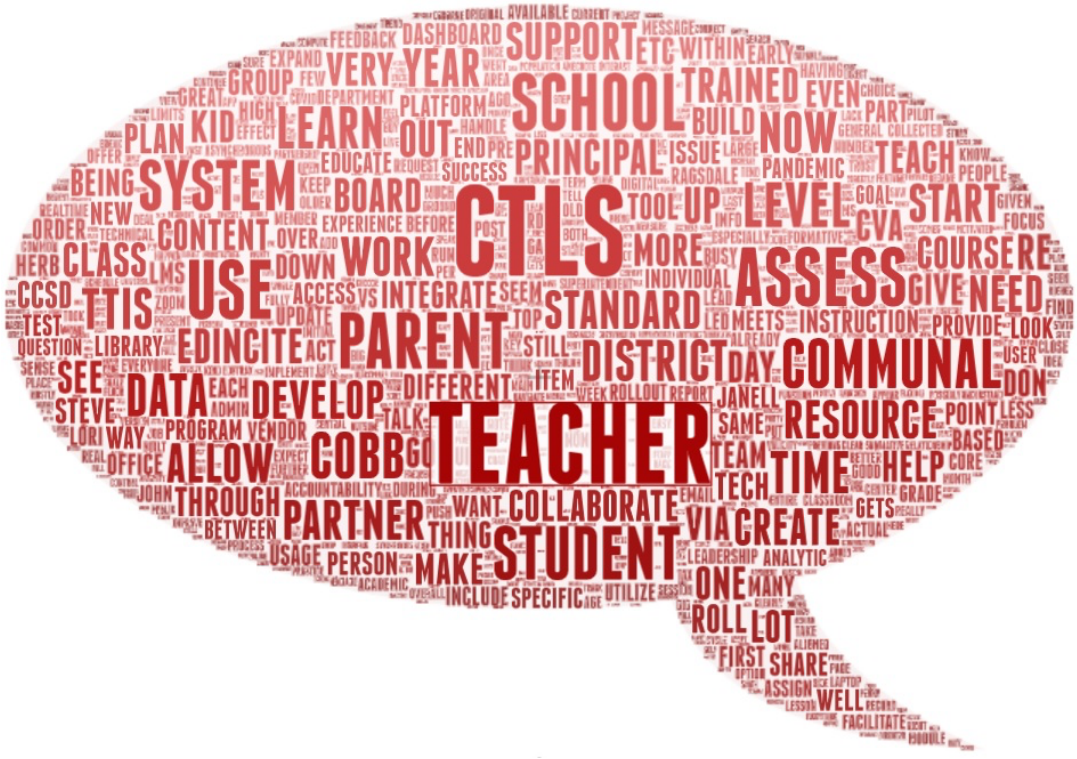
Pictured here, a recently-renovated "Student Commons," previously a Media Center and previously-previously a Library. There is a pattern of purposeful investment in Student Commons in many of Cobb's schools, highlighting the district's prioritization of collaborative learning, accessibility of learning resources, and modernizing learning environments.

CTLS differs meaningfully from other modern DLSs in its design philosophy and digital architecture. Instead of using “off-the-shelf” DLS components, the CTLS team forges living partnerships with education technology companies, and then supports frequent cooperation between all parties. Instead of creating a variegated system made of discrete sub-systems, CTLS seeks uniformity, relevance, and robustness. By design, users should never need to leave a single internet window to interact with the entirety of the CTLS experience. Furthermore, users shouldn’t notice a difference between the Graphic User Interfaces (GUIs) of the Learning Management System (LMS), the Learning Object Repository (LOR), or any of the other more niche expansions (BIS, 2022). In brief, CTLS is not so much a group of “Software as a Service" (SaaS) modules sewn together into a system, but rather a digital environment into which modular functions built out of SaaS programs can be directly integrated. Because of this nonstandard design philosophy, CCSD often refers to CTLS *not* as a “Digital Learning System", but rather as a “Digital Learning Environment" (Knowly, 2022; Wong & Davis, 2022-h).

CTLS was conceptualized to improve the district’s outdated existing DLS in three major ways. First, CTLS would enable tactical targeting and tackling of student needs. This has been achieved through a focus on real-time data generation, as well as allowing more advanced student-by-student differentiation of instruction. Second, CTLS was crafted to increase teacher capacity and autonomy, while simultaneously increasing teacher accountability. Here, too, real-time data is the core principle at play, but CTLS also provides a wide range of tools meant to improve teacher effectiveness and adherence to academic standards. The Word Cloud, produced from an analysis of interviews and observations, prominently features “teacher,” “CTLS,” “student,” “parent,” “system,” “data,” “assess,” “standard,” “partner,” “communal,” and

"*EdIncites*," among others (see Fig. 1). Lastly, CTLS contributes to the ideal of making the district "future-proof;" this is a more nebulous concept that will no doubt be tested over time as CTLS evolves as an initiative (Wong & Davis, 2022-a, 2022-c, & 2022-e). The CCSD team also aimed to avoid the pitfalls that other districts had experienced when selecting "off-the-shelf" DLS platforms from providers; this well-publicized strategy quickly spawned the "For Cobb, By Cobb" slogan that is now used throughout the district (Wong & Davis, 2022-d & 2022-j).

Fig. 1: Word Cloud of key recurrent themes identified through qualitative data analysis of interview/observation notes from site visits to Cobb County School District (Data analyzed from Wong & Davis, 2022-[a-q]).



Building the Cobb Teaching & Learning System "From The Ground Up":

Creation of the Cobb Teaching & Learning System Initiative:

Superintendent Chris Ragsdale was selected by the Cobb County Board of Education in 2014 in part because of his existing record surrounding digital learning initiatives (WSB Local Team, 2014; Dalton, 2015; Scamihorn, 2021). Perhaps due to this fact, he is often assigned the lion's share of the credit for CTLS's success by district officials and the wider community. However, the initiative has benefited from many contributors from both within and outside of the district. While Superintendent Ragsdale and many others in the central office proudly tout the aforementioned "For Cobb, By Cobb" rhetoric, CTLS has always drawn heavily from the efforts of outside partners as well as those of its district team (Wong & Davis, 2022-a and 2022-c). These collaborations have lent CTLS a great deal of additional strength and staying power as an initiative from as early as 2014 (See Fig.2).

Fig. 2: Timeline of CTLS's development. Between the beginning of the COVID pandemic in March 2020 and the start of the 2020-2021 school year in August 2020, CCSD and its partners transformed CTLS from a limited-use LMS to a full DLE (Wong & Davis, 2022-[a-d]).

Date:	Event:
2014	Chris Ragsdale is appointed as Superintendent of Cobb County School District
2014-2015	Development of CTLS begins, including a partnership with LMS provider *EduTrax*
2015	*EdIncites* is founded
2017	*EdIncites* reveals the first version of full Incite® Platform and is subsequently contracted by CCSD's Office of Applied Learning and Design to work on CTLS alongside *EduTrax*
2018	*EdIncites* and *EduTrax* complete work on the launch version of CTLS Assess, and *EdIncites* subsequently acquires *EduTrax* in a buyout
2018-2019	CCSD partners with *ParentSquare* and *Learning Explorer* to work on CTLS

	alongside *EdIncites*, with the goal of expanding capabilities; an approximate 5 year development timeline is established until full release of the expanded CTLS suite
January 2020	The U.S.A. tracks its first case of COVID-19
March 2020	COVID-19 is declared both a Pandemic and a National Emergency, and Cobb Schools close
May-August 2020	CCSD, *EdIncites*, *ParentSquare*, and *Learning Explorer* complete the development of the expanded CTLS suite, which included CTLS Learn, CTLS Teach, and CTLS Parent
2021	*EdIncites* and *Acceleration Academies* merge, keeping *EdIncites* as a brand name
2022	Superintendent Ragsdale mandates CTLS as the district's primary learning tool

The development of the modern iteration of CTLS has taken CCSD nearly a decade of work, and the district continues the DLE's development to this day. A previous LMS had been in development before Superintendent Ragsdale took his position in 2014. However, this primitive and soon-outmoded system was deemed a bad taxpayer investment and scrapped when CTLS's development began (Wong & Davis, 2022-p & 2022-q). Superintendent Ragsdale's vision quickly begat a partnership with digital assessment platform developer EduTrax starting in 2015, beginning a pattern of district-provider partnerships. Between 2015 and 2018, CCSD enlisted two dozen smaller partners to supplement EduTrax's contributions to their burgeoning DLE; these smaller providers would not last, and by 2019 the district had consolidated down to only three core partnerships (Rumble, 2018; Wong & Davis, 2022-a & 2022-b).

Seeking to expand CTLS's assessment capabilities beyond what EduTrax could provide alone, the district further partnered with up-and-coming state-of-the-art DLS provider Education Incites, LLC ("EdIncites") starting in 2018 (Rumble, 2018; Wong & Davis, 2022-a). EdIncites and EduTrax worked together to completely redesign CTLS's assessment architecture using

EdIncites' existing Incite® product line as a framework. The partners' work during this period culminated in the creation of CTLS Assess, CCSD's premiere real-time synchronous digital assessment tool (CCSD, 2022-b; Wong & Davis, 2022-a). After the creation of CTLS Assess, EdIncites acquired EduTrax in a buyout and continued their work with the district. During the 2018-2019 school year, CCSD also pursued partnerships with parent communication platform provider ParentSquare and LOR platform provider Learning Explorer. Now partnered with three key collaborators, CCSD planned for the further development of CTLS with a full pilot expected to be ready within half a decade (Wong & Davis, 2022-a, 2022-b & 2022-j).

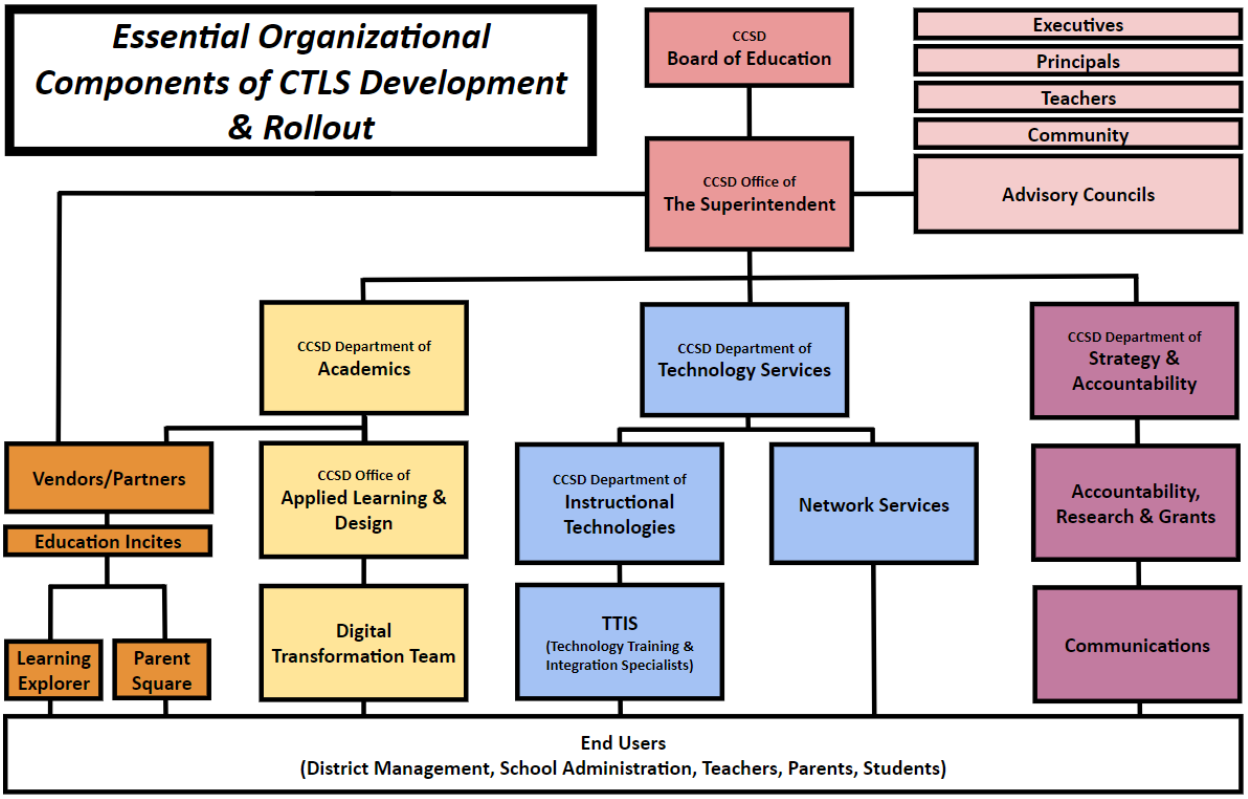
In April 2020, the COVID-19 Pandemic and subsequent lockdown of CCSD schools forced the acceleration of CTLS's development. From May 2020 to August 2020, CTLS transformed from a limited-use digital assessment system intended to serve 20,000 students into a full-service all-in-one DLE used by the entire district of over 100,000 students (Wong & Davis, 2022-e). As Cobb County transitioned to fully-remote learning in mid-2020, the new-and-improved CTLS was rolled out to all students, complemented by a districtwide 1:1 student laptop program. After the initial wave of COVID-19 had been weathered, a 2021 merger between EdIncites and student re-engagement organization Acceleration Academies added dropout recovery functionalities with pedagogical assistance to CTLS, complementing extant district efforts towards that goal (EdIncites, 2021). While exclusive reliance on CTLS was inconsistent from teacher to teacher and from school to school throughout the pandemic, Superintended Ragsdale mandated the DLE as the district's primary instruction tool in September of 2022, codifying the ubiquity of the system (Wong & Davis, 2022-j). Today, CTLS boasts a robust and integrated set of capabilities, broken up into modular categories: The original CTLS Assess for assessment and analytics, CTLS Learn for student use, CTLS Parent for guardian communication

and engagement, and CTLS Teach for use by educators and administration (CCSD, 2022-b). These modules are interconnected through Cobb's secure network, which also includes relevant SaaS providers, data warehouses, student information systems, and a learning object recommendation engine.

*The **Management Structure** of the Cobb Teaching & Learning System Initiative:*

As a full-blown Digital Learning Environment, CTLS has many components and players that must constantly collaborate and work together towards a single goal: student success. This level of internal organization is a formidable goal, and Cobb spends a great deal of time and energy creating and reinforcing management structures to enable this collaboration. Because of the complexity of the project at hand, the organizational structure of the CTLS initiative is somewhat labyrinthine in nature; groups work closely with each other, and their responsibilities overlap enough that community stakeholders and even some district employees express uncertainty regarding which team deals with which aspects of CTLS (Wong & Davis, 2022-f, 2022-j, 2022-l, 2022-t & 2022-y). However, the approach can be understood as a multi-pronged accountability-based model starting with Chris Ragsdale at the top, with management flowing through various offices and into specialized teams, all communicating with each other along the way (See Fig. 3).

Fig. 3: An organizational chart representing essential organizational components of CTLS development & rollout (Compiled using Wong & Davis 2022-[a-y]).



While Chris Ragsdale's strong vision is generally seen as the driving force at the core of CTLS, Ragsdale himself has stated that he "doesn't get in the weeds" when it comes to the DLE's development. Ragsdale's top-level vision is constantly evolving thanks to feedback from both the Board of Education and various superintendent advisory councils. The Board of Education is given an annual presentation on the status of the CTLS initiative, as well as regular updates on development progress. The board then makes funding decisions based on this information, which in turn can affect which aspects of CTLS are prioritized by Ragsdale and his team of Assistant Superintendents. Meanwhile, Ragsdale often consults with his advisory

councils as needed before defining new development directions or mandates related to CTLS. These councils include local business executives, principals, teachers, classroom support professionals, parents, and other community members, each intended to help give Ragsdale a comprehensive understanding of the needs of his end users and stakeholders. Once a vision has been solidified, Ragsdale passes the baton off to the CCSD departmental offices dedicated to working on CTLS. While most district offices are de-facto involved with the development of CTLS in tangential ways, a few offices stand out as core forces guiding and crafting the initiative.

Within the Academics Department, the Office of Applied Learning and Design acts as the overall project manager for CTLS. The Director of Applied Learning and Design is able to delegate a portion of this work to the Digital Transformation Team supervisor. Among other duties, the Digital Transformation team functions as a liaison between district technology partners and internal CCSD staff, including school staff like teachers and principals. The Office of Applied Learning and Design holds annual planning meetings with representatives from the district's three major providers (EdIncites, ParentSquare, and Learning Explorer) as a single group in order to coordinate the year's progress and define each company's deliverables. The Office also holds individual deliverable update meetings with each provider once per quarter to ensure on-track progress (and to re-strategize, when necessary).

The CCSD Department of Instructional Technologies works with the Office of Applied Learning And Design (and other district departments and offices) to develop CTLS rollout procedures for principals, teachers, and parents. These procedures are then codified and disseminated to the 27 Technology Training & Integration Specialists (TTISs) who work under the Department of Instructional Technology. All TTISs attend 1-2 meetings a month to talk

about new initiatives, actionable goals, and changes to existing procedures. On top of these full-team meetings, additional monthly meetings are held for Team Leadership sessions and more open-ended issue-oriented "Huddle" sessions, with further additional meeting time set aside for TTIS mentors to meet with their mentees. In total, the average TTIS attends 1-3 meetings per month, with the most active members attending 4 or more monthly meetings consistently. The TTIS members also informally communicate with each other daily via platforms like Microsoft Teams.

On the technical side of things, CCSD's Department of Technology Services performs its duties as the technological center of the district by maintaining and expanding crucial hardware. Where CTLS is involved, much of the daily upkeep is handled by the Office of Network Services. This group frequently works directly with the corporate partners to ensure the efficiency, safety, and capacity of CTLS's digital systems and data. Sometimes, this can even mean slowing down a provider's preferred development pace in order to give the district a chance to roll out system changes and receive valuable feedback from end users.

This feedback- as well as all other forms of the district's trackable data- filters through the Office of Strategy and Accountability. CTLS is as much a tool of accountability as it is a tool of pedagogy, so it makes sense that the Chief Strategy & Accountability Officer and the Assistant Superintendent of Accountability, Research & Grants are both heavily involved in the initiative. These two district leaders and their office provide the evidence of CTLS's success, and offer important guidance used in maximizing the initiative's effectiveness. This office is in close contact as needed with the Superintendent, and is frequently involved in the meetings of other departments and offices.

Involving Community Stakeholders in The Development Loop:

Architects and designers of CTLS cite its collaborative nature as one of the keys to the initiative's success (Wong & Davis, 2022-b, 2022-c & 2022-q). CTLS facilitates the collaboration of teachers, administrators, management, technology support personnel, parents, and private-sector partners. At the same time, the initiative relies on the very collaboration it enables for its success and growth. By all accounts, the direction of CTLS's development has been mapped out according to educator, administrator, and parent feedback. CCSD actively pursues new features with its existing partners in response to CTLS end users' stated needs, as well as seeking out new SaaS partners to address more niche areas. This serves to increase community voice and promote community buy-in for the initiative, thus circumventing two of the largest obstacles in successful DLS rollouts (Blundell, Lee, & Nykvist, 2016). The district solicits feedback directly from all end users of CTLS, and performs qualitative analysis to determine the top feedback points to address in coming development cycles. As these most-requested points are addressed, new friction points are subsequently identified via further feedback for remediation. In this way, CTLS has exhibited a rapid improvement cycle thanks to a constant influx of relevant end user feedback collected by a responsive development team leveraging varied provider partnerships (Wong & Davis, 2022-f, 2022-j & 2022-l).

How District Leadership & Values Advance The Cobb Teaching & Learning System:

The Effect of Cobb's Values on The Cobb Teaching & Learning System:

Cobb County School District expresses a consistent set of top-level values which have informed the goals, methods, and development of CTLS. These values have existed since before

the advent of CTLS, and before Chris Ragsdale's superintendency; however, the values of Chris Ragsdale's superintendency and the longer-held values of the district are usually presented as functionally identical in interviews and public statements. In part because of this convergence of values, Ragsdale and CTLS have enjoyed a great deal of buy-in from teachers, administrators, and executive district staff.

The core value of Cobb County is used as both their motto and their stated mission: "One Team, One Goal: Student Success". The tangible effects of this value can be found in many facets of CCSD's management, and have become more explicit under Superintendent Ragsdale's leadership. For example, the district has put a focus on team-building through Professional Learning Communities (PLCs) and a cohort-based instructional model, collaborative innovations (CCSD, 2018; Wong, 2022; Wong & Davis, 2022-a, 2022-c, 2022-j and 2022-q). These additions to Cobb's instructional practice have allowed teachers to collaborate within and between subjects in order to best serve students and save both planning and preparation time. Furthermore, the district has taken to utilizing a collaboration-centered corporate partnership vetting process. The district designed this process specifically to identify providers that are ready, willing, and able to work together for the benefit of Cobb's students, as opposed to those capable of being providers but not partners (Smith, 2015).

CTLS strengthens the ideal of "One Team, One Goal: Student Success" through many of its inbuilt functions. The very existence of CTLS as a digital platform helps to consolidate the district's digital presence, once scattered throughout countless unaffiliated webpages, blogs, and services. Parents and teachers throughout the district recall a time pre-COVID when a single student would have to manage nearly half a dozen different platforms at once. None of these platforms could be easily monitored, secured, or standardized, leading to accountability issues

(Wong & Davis, 2022-q). CTLS facilitates learning object creation and exchange between teachers as well, enabling educators to utilize and build upon existing materials instead of constantly having to invent new ones from whole cloth. As for student success, an encouraging number of indicators suggest that CTLS likely played a role in Cobb's impressive academic recovery from the Covid-19 pandemic (GaDOE, 2022-a & 2022-b; GOSA 2022-a & 2022-b; CCSD, 2022-a & 2022-b.).

CCSD's strong relationship to its community is frequently touted by administration as another of the district's foundational values. This community relationship manifests in different ways at different district levels, with significant range in how school employees conceptualize the community. Some teachers talk about parents as "critical partners" in their children's education, while others flatly state that their school is "not a parent-responsive school environment." The School Board has their own descriptions for the greater Cobb community, often referring to them as "our customers" or "our citizens" (Scamihorn, 2021). Regardless of the specific interpretation, managing CCSD's relationship to its city's residents and businesses is a top priority, including CTLS's development and rollout.

As for the community's ability to reach out to the district, Cobb residents have long had the opportunity to offer direct feedback through the CCSD website; this opening has been actively extended to the CTLS Parent platform as well. For a more formalized approach, a nonprofit called the Cobb Schools Foundation offers a broad means of community impact on CCSD. Meanwhile, individual school-based foundations and Parent-Teacher-Student Associations (PTSAs) allow for targeted school-based community involvement in the education of Cobb's students. In addition, Chris Ragsdale directly involves a range of local community

members in district-level decision-making by way of his various advisory boards (Wong & Davis, 2022-c).

The advent of CTLS Parent can be read as the result of Cobb's prioritization of community relationships, especially as it pertains to the parents and guardians of their students. The platform is designed to grant parents and guardians an unprecedented level of access to student data, teacher and administrator communication, digital materials, intra-scholastic parent collaboration opportunities, and more. CTLS Parent also facilitates push notifications and real-time communication from teachers to parents, enabling a high potential for community outreach. While there are still significant improvements to be made in the realm of effective parent involvement, CCSD has built a strong foundation with the creation of this unique sub-platform purpose-built to empower families within their community.

The Evolution of Cobb County School District's Leadership & Vision:

> "The classroom gets more complicated for students, parents, and teachers every year. It doesn't have to be. The Cobb Teaching & Learning System is designed to give students better resources, parents more information, and teachers more time."
>
> - *Chris Ragsdale (CCSD, 2022-b)*

Coming from the education technology sector, Superintendent Ragsdale's vision for Cobb has always been a transformative and forward-looking one. Immediately after he accepted the superintendency, Ragsdale quickly set his sights and his efforts on academic acceleration.

From the start of Ragsdale's leadership, he laser-focused on building educational infrastructures that could self-perpetuate student achievement while prioritizing efficiency and

scalability. Under Ragsdale, CCSD kept its strategies of success within district control instead of relying on outsourced providers for educational materials. Over time, this practice of aiming towards district ownership became crystalized in the oft-repeated phrase, “For Cobb, By Cobb” (Wong & Davis, 2022-d & 2022-j). While self-sufficiency was the stated goal, a surprising amount of Cobb’s success during Ragsdale’s early months and years in the district can be attributed to the unique approach to corporate partnerships that he facilitated. These partnerships became especially important to CTLS, which rose to become the crown jewel of Ragsdale’s slate of policies. Ragsdale believed that CTLS would upgrade the educational experiences of Cobb’s students, parents, and teachers alike while keeping its technology customizable, developmentally nimble, and “future-proof” (Scamihorn, 2022; Wong & Davis, 2022-d, 2022-q & 2022-s).

Ragsdale’s vision for CTLS radically expanded on Friday the 13th, March of 2020. All at once, the “future” that Ragsdale had been preparing to “proof” Cobb against arrived full-force in the form of the COVID-19 pandemic. As a long-term shelter-in-place mandate was announced, CTLS quickly had to be transformed into the core of CCSD’s infrastructure. In a matter of a few months, CTLS shifted from a half-completed adjunct of Cobb’s pedagogy into a “one stop shop” for all management, administration, educator, parent, and student needs. The idea of using CTLS as a repository and distributor for all district materials worked well with Ragsdale’s vision of CTLS as the ultimate accessibility and accountability tool.

Finally, and crucially, CTLS became the primary means through which students could access their education regardless of their location. Cobb had long been experimenting with digital and asynchronous systems through Cobb Horizons (established after a two-school consolidation under Ragsdale) and the Cobb Virtual Academy (also known as CVA, founded in 2001). CVA in particular served as a test kitchen for many of the methodological and

management norms later adopted by CTLS. Originally conceived of as a way to offer critical remedial core classes around the work and life schedules of high school students, the CVA program has transformed over two decades to offer more than sixty courses and branch out significantly in terms of content and access methods. The program has experienced a consistent 10% annual growth rate for many years, but 2020 saw a massive increase in CVA attendance to unprecedented levels as students clamored to curtail learning loss (Wong & Davis, 2022-o).

In time, the district saw the additions of the CTLS-powered Cobb Online Learning Academy (COLA) and Elementary Virtual Program (EVP) in addition to Horizons and CVA. All four of these specialized programs have continued (alongside expanded general use of CTLS) in order to offer a menu of learning access methods to Cobb's students regardless of their physical location. This tenet of Ragsdale's vision is now frequently simplified to "Learning Everywhere", and is often cited as one of CTLS's greatest strengths (CCSD, 2022-c).

Financial Trends As Indicators of Prioritized Values & Visions:

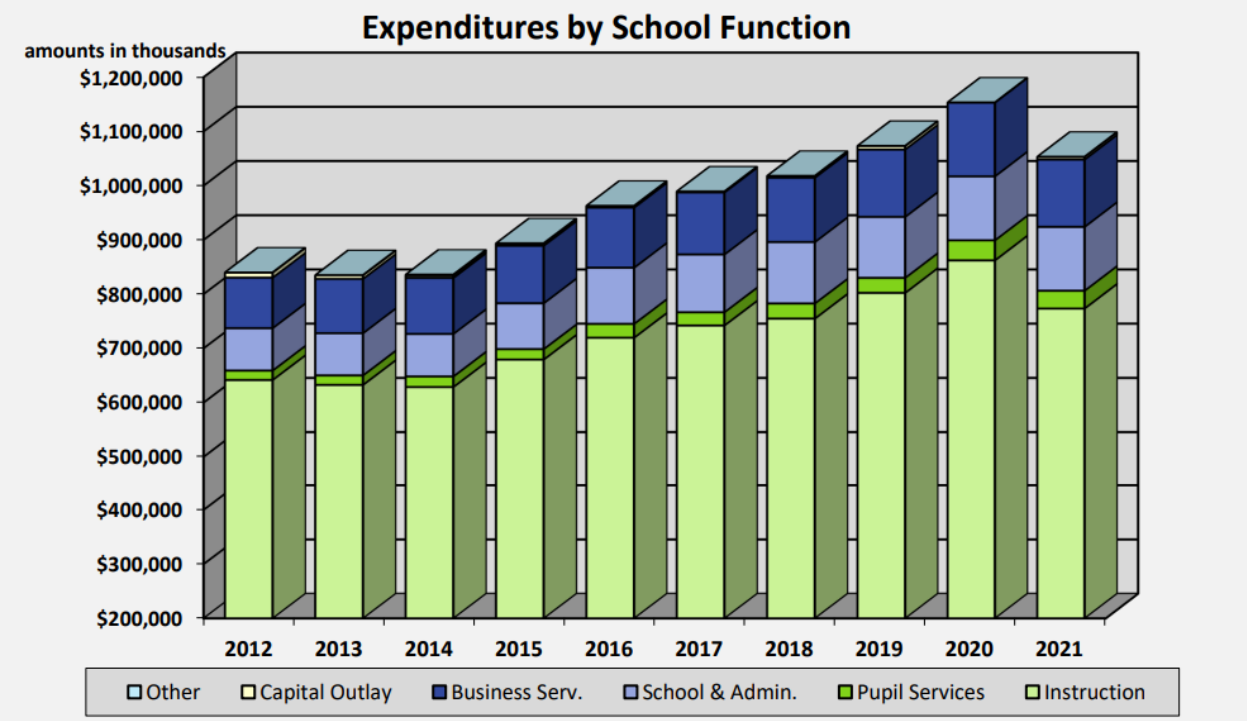
Pictured here is an example of individualized student engagement in a core-subject lesson supported by CTLS. Technology investments, such as laptops for students are common within CCSD throughout the district, with clear efforts towards technological access and equity.

Vision and values are reinforced by strategic investments in CTLS and CTLS-supporting infrastructure. By design, CTLS permeates nearly every aspect of the CCSD ecosystem and has become financially inseparable from it. Many budgetary categories that fund CTLS also include non-CTLS items. Nonetheless, looking at certain spending trends within the district over time can provide a glimpse into the magnitude of the investment and its alignment with CCSD's values.

CCSD's expenditure trend in the key category of Instruction reinforces Cobb's stated values and vision for CTLS (CCSD, 2021-b; see Fig. 4). Instructionally speaking, data from 2011-2020 shows a clear change in the district's spending habits after the instatement of

Superintendent Ragsdale and the advent of CTLS. While the previous four years had seen a stabilized instructional expenditure hovering around $635 million, 2015 (the first fiscal year under Ragsdale) saw a meaningful increase to just under $680 million. This proved to be the start of an upward trend in instructional spending, with current instructional spending in 2020 well surpassing $800 million annually (CCSD, 2021-b).

Fig. 4: Expenditure Trends by School Functions. Instructional function has driven the rising CCSD budget since 2014. This suggests an active increase in the district's investments in CTLS until 2021, when CTLS system development became stabilized. Also, between 2012 and 2021, enrollment shifted from 106,836 students in 2012 to 105,949 in 2021, a reduction of almost 1,000 students. This suggests that the per pupil instructional expenditure has increased even more dramatically than the graph suggests (CCSD, 2012; CCSD, 2021-a).



Expenditures in instructional function are consisted of a wide range of categories, including technological and curricular investments necessary to develop, roll out, and

continuously improve CTLS. The observed upward trend in instructional spending from 2015 onward speaks to a growing district financial focus on instructional improvement; this directly echoes the stated values from which the CTLS initiative was engendered. The drop in 2021, in turn, may indicate a stabilization in instruction spending in concert with a stabilization in CTLS's development.

Part 3: Collaboration, Technology, and Real-Time Data At The Core of CTLS

EdIncites, the Cobb County School District, and Their Distinctive Partnership:

Among CCSD's corporate partnerships, their partnership with EdIncites stands out as unique. After the 2018 acquisition of previous LMS provider EduTrax, EdIncites assumed the position of primary collaborator on the CTLS initiative. Having earned a great deal of trust from Superintendent Ragsdale through their early successes with the system, EdIncites was "let off the leash" somewhat, given more input and more responsibility in the development of CTLS's digital architecture (Wong & Davis, 2022-q). By the last quarter of 2018, EdIncites' contribution to CTLS had expanded significantly; whereas they had started out merely providing a set of evaluation tools, EdIncites soon came to be seen as a self-contained digital scaffold into which new additions to CTLS could be seamlessly integrated.

It was at this point at the tail end of 2018 that the district pursued other major CTLS partners, namely ParentSquare and Learning Explorer. Given the existing relationship with EdIncites and the integrative nature of the new partnerships, the district came to rely on EdIncites as a coordinator for the other major partners. At the time of writing, this semi-

formalized partner management structure remains strong; while the Office of Applied Learning and Design still has significant direct communication with all individual partners, day-to-day collaboration between providers is now managed largely by company founder & COO and CEO of EdIncites (Wong & Davis, 2022-a, 2022-b, 2022-c & 2022-d). Communication between corporate partners happens frequently as needed. These meetings act to replace the more strictly-scheduled collaboration conferences held by the Office of Applied Learning and Design in the time of the COVID-19 Pandemic while CTLS underwent mass rollout. EdIncites also had frequent communication with Superintendent Ragsdale during the mass rollout phase of CTLS, but now that confidence has been established in the quality of their work, Ragsdale has been able to return to his preferred less micromanaging approach (Wong & Davis, 2022-q).

Edincites' role within the CTLS initiative is critically important according to district management, yet it is undeniably an atypical one for a corporate partner to fill. When analyzing this unique positionality, EdIncites can be viewed through the lens of the backbone organization. Originally codified by John Kania and Mark Kramer in their work on Collective Impact Theory, a backbone organization is a dedicated and designated entity which takes on the task of orienting a group of collaborative parties towards a singular collective goal (Kania & Kramer, 2011). Whether by intent or by happy accident, this is exactly the function that EdIncites fills for CCSD's partners and, by a few accounts, parts of CCSD itself (EdIncites, 2022; Wong & Davis 2022-a, 2022-b, 2022-l & 2022-q).

While CCSD potentially could have stepped in to fill the role of backbone organization, there are notable advantages to putting EdIncites in this position instead. The primary perk of having EdIncites in such a pivotal role organizationally is that their platform already fills the same basic role technologically. The modern CTLS environment is built off of scaffolding based

on EdIncite's Incite line of products (primarily Incite® Classroom and Incite® Assessment). Because of this, much of EdIncites' contribution to CTLS acts as a 'backbone system' into which other partners' products can be integrated. Giving them the organizational leeway to manage their co-partners in a similar way may partially explain the relatively nimble, forward-moving, and organized development process that CTLS has enjoyed.

This multi-pronged management structure also leverages the high-quality relationship that the district maintains with EdIncites in order to let their partners self-regulate to a degree, thus decreasing central office workload (and potentially central office costs as well). There is no doubt that Cobb's central office is a bustling organizational hub with dozens of interconnected offices collaborating and administrating concurrently. Since the collaborating partners already have established management teams in place, a level of delegation is both expedient and effective for Cobb. A high degree of professional trust and respect extends out to partners and the district, creating strong mutuality between them that allows them to complement each other's roles expertly.

The Critical Role Of TTIS Members as "Boots On The Ground":

*An Introduction to **The TTIS Initiative:***

Cobb's team of around thirty Technology Training & Integration Specialists- known by the acronym TTISs- is something of a "secret ingredient" to CTLS's success. Under the supervision of the Instructional Technology department head, the TTISs were described as the "boots on the ground" of the CTLS initiative by central office administration. The TTIS members- all certified former teachers of high caliber- provide support and guidance to

management, administration, educators, students, and parents. Each member is assigned to three schools, and they physically circulate between them on a set schedule while also offering remote digital assistance to all of them simultaneously. Now that CTLS's place in the district has been cemented and expanded, so too has that of the TTIS members; the director of instructional technology has sought to further expand the purview and capacity of the TTIS program to meet this growth in need. While delicate to quantify exactly, TTIS members were a "critical" factor in the successful rollout of CTLS, and continue to contribute significantly to the DLE's growth.

The Specific Duties Of The TTIS Members:

The TTISs were charged with many oft-overlooked but important tasks during CTLS's rollout, most of which now seem to have fallen into their domain in perpetuity. Members of the TTIS team spend most of their time assisting teachers directly, either in-person at their assigned schools or digitally using CTLS itself. They also provide training to teachers and principals regarding CTLS features, expected usage, and program updates. The TTIS members periodically give standardized surveys to recently-trained groups to make sure that information is being transmitted effectively, and to check up on where school staff feel they are in the CTLS integration process. This training and survey content is all drafted and distributed at twice-monthly update meetings attended by the TTIS members, staff from the Department of Instructional Technology, and other relevant administrators and officers from the wider district (Wong & Davis, 2022-g and 2022-k).

The TTIS program works closely with school leaders to address the specific needs of individual schools, customizing their approaches and training focuses for each of the diverse school communities that they serve. Principals often sit in on teacher-targeted TTIS training, and

keep in communication with their assigned TTIS member as needed. According to district officials, principals and other school leaders are sometimes the first community members to adopt new digital behaviors, which appears to be anecdotally correlated with increased teacher adoption of these behaviors in turn (Wong & Davis, 2022-k and 2022-m).

The TTIS program is tasked with providing aid to groups outside of instructional and administrative staff as well. TTIS members provide district-level training seminars that cover broader categories of CCSD staff, as well as specialized training for custodians, bus drivers, cafeteria workers, and more. The program has also become a crucial cog in parental relationship-building; TTIS members host periodic school-based "Parent Tech Nights" to formally instruct parents on optimizing their use of CTLS, and sometimes even offer personalized assistance to parents in less formalized settings as well (Wong, 2022; Wong & Davis, 2022-g, 2022-k, and 2022-m).

TTIS Member Selection & Assignment:

TTIS membership is composed of about thirty individuals who are characterized by their department as "high-energy, motivated former teachers and media specialists". They are seen as representatives of teacher voice in top-level design conversations. Working from this strong experiential basis, TTIS are given a high level of training and skill upkeep, with some TTIS members attending 4 or more meetings in a given month (Townsend, 2022; Wong, 2022; Wong & Davis, 2022-k). This heavy training gives these individuals a nearly unparalleled level of understanding of the capabilities of CTLS and how to best utilize them. Once selected and trained, a TTIS member is assigned to three individual schools within CCSD. There is "a reported complex decision-making process" for determining which TTIS members get slotted

into which specific schools, but to the layman the method appears largely based on timing; if a school needs a new TTIS, and there is a new TTIS available, then that specialist is matched with the school currently in need. TTIS members are expected to form strong relationships with their school communities, so member caseload changes are seen as inopportune for everyone involved and are therefore rare. One exception to this norm is in the case of pilot programs; CCSD sometimes selects high-need schools for pilot programs of new CTLS features, and these schools take priority both in product rollout and also in TTIS member assignment.

Community Reception to the TTIS Initiative:

School and parent communities in Cobb are very receptive to TTIS members overall. TTIS members are considered “crucial allies” and “critical friends” in the district’s mission to incorporate CTLS into day-to-day use. "We really see [our school’s TTIS member] as a partner”, one lower school teacher stated in an interview; this appears to be a recurrent opinion professed by teachers districtwide across grade levels. In some way, this amicability isn’t surprising; CTLS’s popularity grants the TTIS members an audience predisposed to appreciate their presence. Furthermore, CTLS and the TTIS share a mutualistic relationship. There are few people in Cobb County as enthusiastic about the potential of CTLS as members of the TTIS team, and this fuels enthusiasm for the program in the wider community. Indeed, generating and maintaining goodwill for CTLS is a matter of professional norms for the TTIS members.

As one lower school TTIS member pointed out, the TTIS team is a non-evaluative force in the district that- while hierarchically above teachers in the district’s organization- exists solely to make things easier for everybody else. This is an astute observation; the TTIS members act as programmatic catalysts, lowering the difficulty threshold for initiative integration and making

districtwide transformations possible with otherwise hard-to-reach groups. Gaining teacher buy-in is one of the most complicated parts of large-scale initiative rollouts. While wholesale enthusiastic use of CTLS isn't quite universal at the time of writing, the general level of vocal buy-in for such a transformative initiative is noticeably high, even among teachers who haven't mastered the intricacies of the program yet.

The Future Of The TTIS Initiative:

As of September 2022, the TTIS team was stretched thin according to team members and management (Davis, 2022-a; Wong & Davis, 2022-k and 2022-l). Programmatic and individual workloads were increasing as more students, parents, and schools adopted deeper uses of CTLS all at once in accordance with Superintendent Ragsdale's universal CTLS use mandate earlier that month. Objectively, this was a positive moment for the CTLS initiative as a whole; nevertheless, a number of TTIS members began to voice beleaguered acceptance of the idea that a further stretching of TTIS resources was inevitable in the coming months, not expecting additional resource allocation or workload redistribution for the team (Wong & Davis, 2022-k).

At the same time, the TTIS approach has proven an integral strategy of the Instructional Technology department, and one which the instructional technology team plans to expand going forward if possible. According to the most recent strategic plan from the department, the work of the TTIS may soon be further supplemented by additional staff, funded by a grant from the Georgia Department of Education (Townsend, 2022; Wong, 2022). There are also mentions in the strategic plan of tailoring TTIS assignment and training according to the needs of individual schools, In other words, the TTIS program may be about to experience an intentional top-down differentiation which will custom-fit each member's ability to aid their specific setting more

precisely. This seems to be an expansion of the natural diversification that has occurred within the TTIS, and it is a bold move for the initiative. Time will tell what comes of it, but the prospect is auspicious; if nothing else, this sort of long-term planning indicates that the TTIS will remain an integral part of the CTLS initiative going forward.

Building A Community Of Teaching Practice In Cobb County School District:

Defining Communities of Practice:

The CTLS initiative constitutes an ongoing effort to strengthen a Community of Practice (CoP) for its teachers and school staff. Originally coined by cognitive anthropologists Jean Lave and Etienne Wenger in reference to formalized apprenticeship structures, Communities of Practice are defined as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner & Wenger-Trayner, 2015). This definitional framework handily identifies the three aspects necessary to construct an effective CoP: a Domain, a Practice, and a Community (Wenger-Trayner & Wenger-Trayner, 2015). While CoPs often arise naturally in collaborative fields like education, they can be intentionally strengthened by improving upon any of the individual aspects that comprise them.

The CTLS initiative has been careful to develop a self-reinforcing multi-tiered system of CoPs within the district. At the top level, district leaders, departments, offices, and partnerships have intentionally structured their collaboration such that a community of practice has been constructed around the domain of "creating CTLS". More importantly, though, the CTLS DLE is designed to build on an existing community of practice centered on the domain of "student success".

Cobb County School District's Community Of Practice Before The COVID-19 Pandemic:

CCSD has been working toward expanding its community of practice since before the mass rollout of CTLS. Under Chris Ragsdale's superintendency, collaborative initiatives were established and expanded. A Professional Learning Community (PLC) initiative- led by the newly overhauled Leadership Division - sprung up in early 2020, having been in development by the district well before that point. The PLC program focuses on creating same-grade teacher teams and promoting a sense of greater community within Cobb's teaching professions. The initiative focused on the specific areas of Instruction and Innovation Support, New Teacher Support, On-Demand Learning, Creating Teacher Leaders, and meeting the professional learning goals identified by the federal Title IIA funding program (CCSD, 2022). District management and school staff express a general belief in the success of the PLC program, with plans established to expand the program to include cross-grade vertical teaming going forward. The district also made the formation of a community of practice a common goal in their various strategic plans at least as far back as 2018. These widely-circulated district-level strategic goals included, but are not limited to: "Developing teacher leaders"; "Developing professional learning needs based on TKES and LKES evaluations and collaboration rubrics"; and "Conduct weekly, collaborative, teacher team meetings based on the 4 critical questions" (CCSD, 2018). Even in 2018, the district's strategic plan referenced the use of CTLS as a means of facilitating accountability and collaboration, well before the program's full rollout in 2020 and even longer before its districtwide mandated use in 2022. (CCSD, 2018)

CTLS Teach & Collaboration Through Learning Objects:

The CTLS Teach aspect of the CTLS Initiative allows for a high level of curricular collaboration between teachers, enabling the Community aspect of CoPs in innovative nontraditional ways. Individual Teachers or cohort teams can use the materials in CTLS Teach's LOR to create shareable "lesson playlists", referred to as Collections (CCSD, 2022-b; Wong & Davis, 2022-l). Select teachers can also submit individual learning objects of their own creation for review and addition to the LOR, though this is currently a rarity (Wong & Davis, 2022-l & 2022-o). LOR usage data suggests that CCSD teacher-created material may be more widely distributed by district educators than material created by other entities. Learning objects uploaded directly to CTLS by teachers (instead of linked to via an outside website) are the most popular category of learning objects used in CTLS classrooms. Additionally, uploads to Sharepoint, Google Forms, and Google Docs (categories which are also dominated by teacher-created content) are all among the top 5 most-used categories. Combined, the utilization of these categories dwarfs that of every other major category, comprising almost half of all distributed content links (CCSD, 2022-d). This tracks with anecdotal data from the district, with many teachers going out of their way to praise CTLS's "teacher led, teacher owned item design" (Wong & Davis, 2022-i).

The magnitude of usage of these categories could be interpreted in a few different ways, some very promising. In the best case scenario, Cobb's teachers may not only be generating high amounts of content on their own, but it is also possible that this created content is being utilized by more than just one teacher at a time. In this interpretation, the teachers of Cobb are sharing their learning objects frequently in the form of CTLS Teach Collections. Even a less positive

interpretation would point to either significant teacher content creation or significant teacher content sharing. Either outcome alone constitutes a major win for CTLS. In point of fact, Cobb's public-facing usage data is not fine-grained enough at this time to determine which interpretation is correct. It is equally dicey to discern whether or not some learning objects in the identified categories were actually downloaded from an outside source and then reuploaded to CTLS or Sharepoint or Google; however, given the needless added complication of doing so, it is unlikely that this would be a meaningful effector of the overall conclusions.

Increasing Teacher Camaraderie Through Digital Communication:

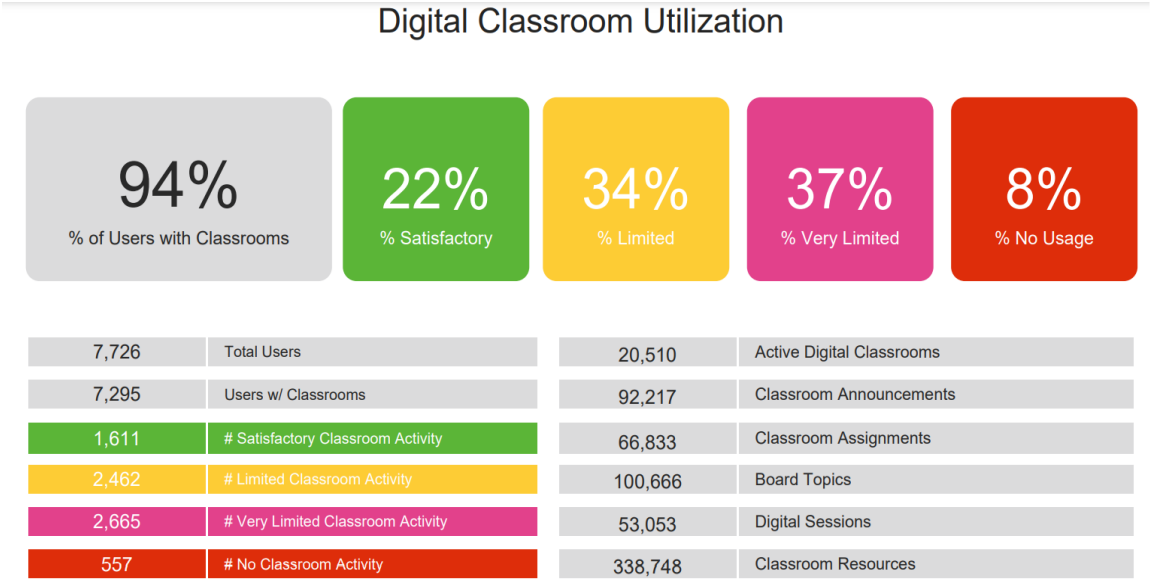
Teachers throughout the district affirmed that CTLS facilitates "constant contact" throughout the teaching community (Wong & Davis, 2022-i, 2022-m, 2022-u, 2022-v & 2022-w). This manifests in both formal communication (such as that between PLCs, co-taught class teams, mentors/mentees, school-run organizations, and TTISs) and informal communication (between affinity groups, out-of-school event planning groups, and special interest groups). CTLS offers a robust set of messaging functions utilized by all CTLS-adjacent school staff to communicate with one another. This suite includes email, direct messaging, Zoom-facilitated video calling, and an inbuilt shared calendar among other features (CCSD, 2022-b). While overall use of these features varies widely based on a number of factors, the teachers who take advantage of them report feeling appreciative for them, stating that CTLS had helped them feel like more of a team; this was especially true during the pandemic, when communication was singularly important in maintaining a sense of fellowship for the teachers (Davis, 2022-b; Wong & Davis, 2022-i).

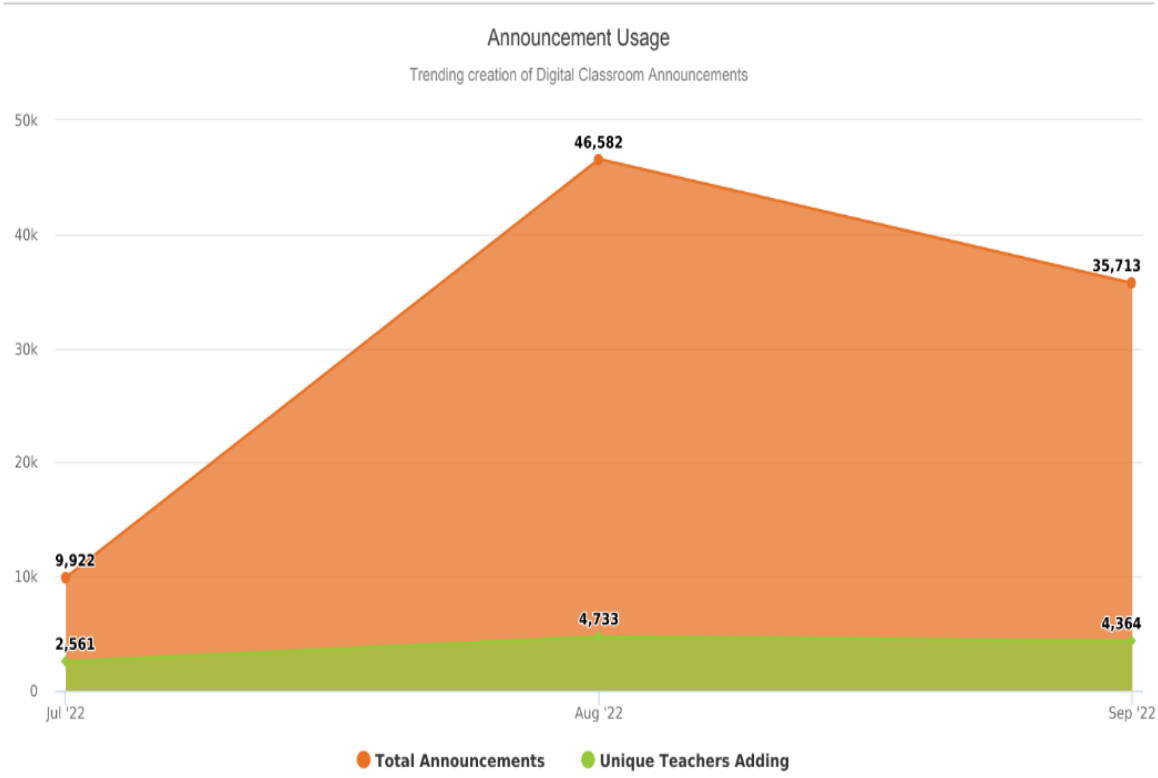
The CTLS Utilization Dashboard as a Tool of "Meta-accountability":

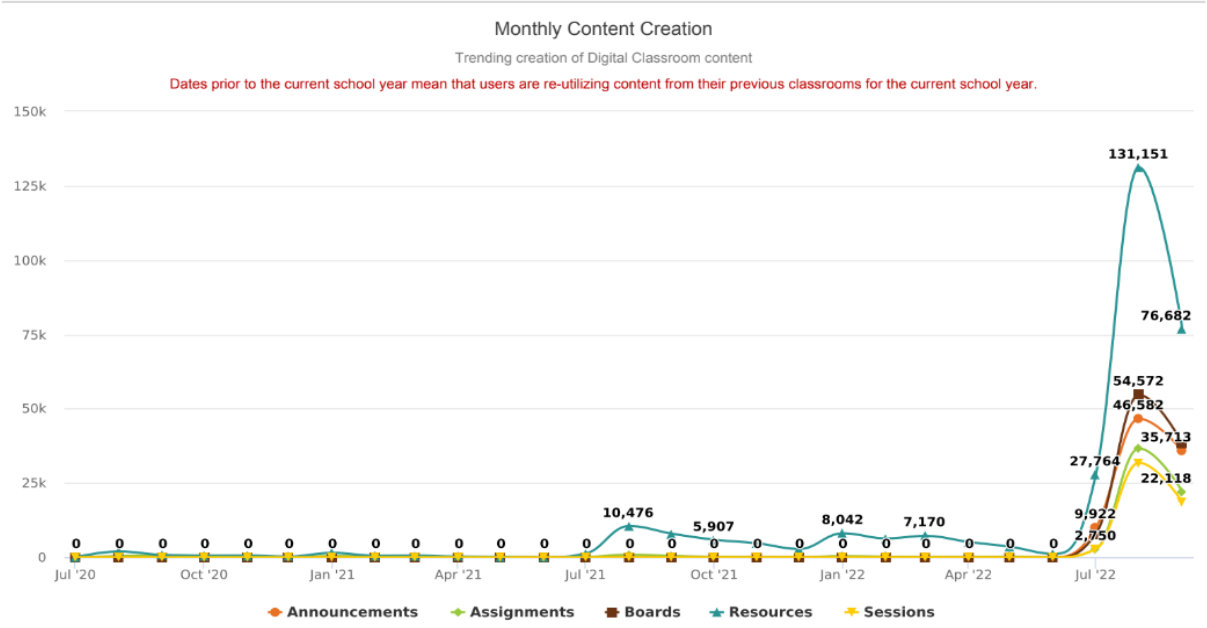
Defining the Utilization Dashboard:

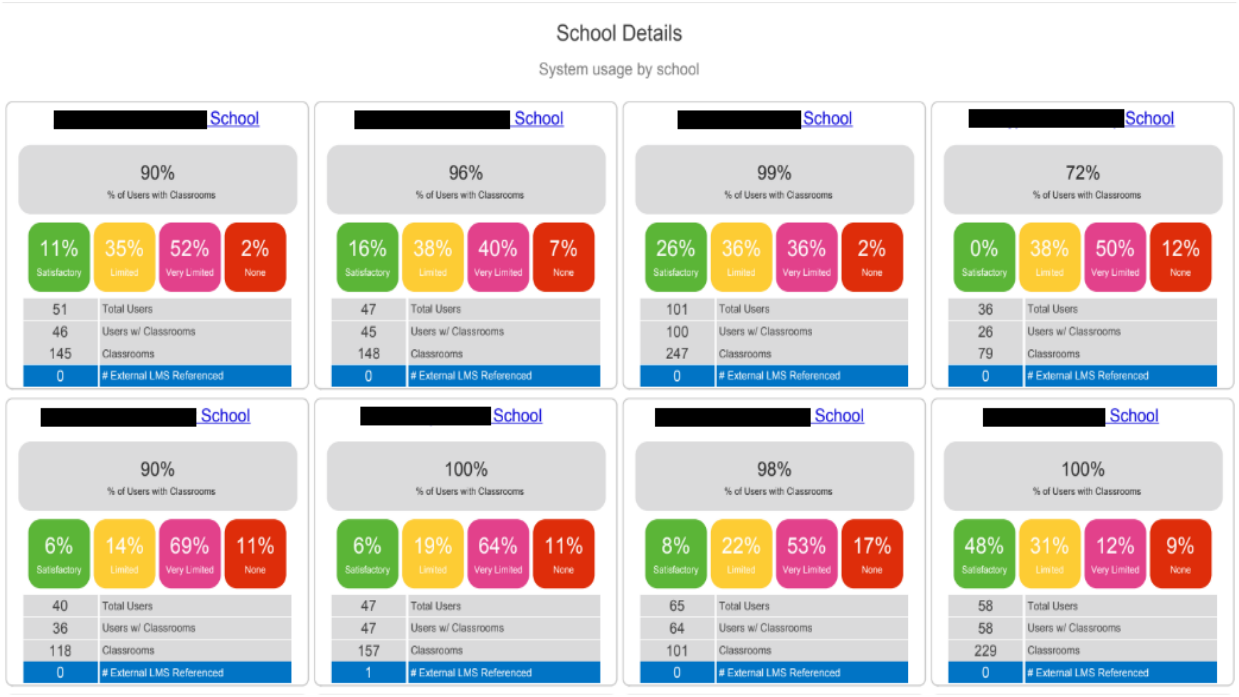
Of all of the CTLS's technological innovations based on the generation and accessibility of real-time data, the CTLS Utilization Dashboard is one of the most intriguing as a transformative concept. The Utilization Dashboard is an extension to CTLS developed by CCSD alongside EdIncites which gives an easily accessible instant snapshot of pertinent data to district management. It is a very new addition to CTLS, having only been released for live use to district management in August of 2022 (Wong & Davis, 2022-f and 2022-l). The information included in the Utilization Dashboard concerns the use of CTLS itself, rather than traditional academic data. In essence, the Utilization Dashboard is an accountability tool that can quickly and easily express a class-by-class, teacher-by-teacher, school-by-school, and districtwide analyses of CTLS adoption, proficiency, and use patterns (Wong & Davis, 2022-l; see Fig. 5).

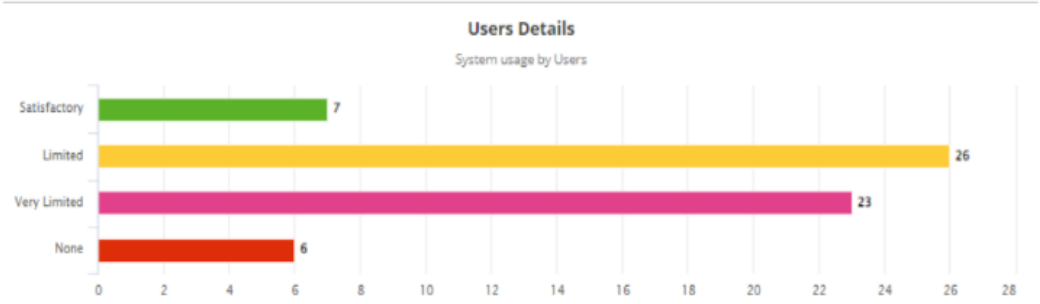
Fig. 5: Snapshots of the CTLS Utilization Dashboard. Certain information has been redacted for privacy. (CCSD, 2022-e)




Announcement Usage
Trending creation of Digital Classroom Announcements
50k
40k
30k
20k
10k
0
46,582
35,713
9,922
4,733
4,364
2,561
Jul '22
Aug '22
Sep '22
Total Announcements
Unique Teachers Adding


Monthly Content Creation
Trending creation of Digital Classroom content
Dates prior to the current school year mean that users are re-utilizing content from their previous classrooms for the current school year.
150k
125k
100k
75k
50k
25k
0
131,151
76,682
54,572
46,582
35,713
27,764
22,118
10,476
9,922
8,042
7,170
5,907
2,750
Jul '20
Oct '20
Jan '21
Apr '21
Jul '21
Oct '21
Jan '22
Apr '22
Jul '22
Announcements
Assignments
Boards
Resources
Sessions





User Name	Usage Index	Job Title	External LMS Links	Classrooms	Announcements	Board Topics	Digital Sessions	Assignment	Resources
[redacted]	Satisfactory	Teacher	0	6	126	15	1	12	137
	Satisfactory	Teacher	1	1	15	16	0	5	10
	Satisfactory	Teacher	0	1	9	5	0	4	26
	Satisfactory	Teacher	0	1	5	3	0	5	10
	Satisfactory	Teacher	0	1	6	5	0	5	12
	Satisfactory	Teacher	0	1	5	3	0	9	7
	Satisfactory	Teacher	0	1	6	5	0	5	12
	Limited	Teacher	0	2	6	3	0	13	10
	Limited	Teacher	0	1	4	0	0	0	0
	Limited	Teacher	0	3	8	3	0	18	12

Using the Utilization Dashboard Today & Tomorrow:

The CTLS Utilization Dashboard is a powerful tool, but like any tool it is only as good as the hands that wield it. At present, those hands are limited to district management, but there are plans to expand to all schools in August 2023. For the time being, information from the dashboard can be copied or exported and given to these administrators as needed in order to best serve their schools. The central office has remained adamant that the Utilization Dashboard (much like the TTIS initiative) is a non-punitive measure meant more to guide schools towards success than to label those teachers not meeting expectations (Wong & Davis, 2022-k & 2022-l).

Given the short time that the dashboard has been live, it is unclear whether this intended non-punitive use has been (or will be) the norm. A number of teachers in Cobb have expressed concern to upper management that the data provided by the dashboard will be levied against them in a potentially negative way (Wong & Davis, 2022-b). However, district leaders are adamant that they primarily intend to "use the dashboard as a coaching tool and conversation starter" (Wong & Davis, 2022-o).

As for the future of the dashboard, there is already talk of expanded functionality between the district and its partners. Now that the core of the dashboard is constructed, much like the rest of CTLS, the other partners' services can be integrated into the scaffold set up by the district and EdIncites. The next partner to be involved in the dashboard will likely be ParentSquare, as the integration of parent contact and conference information could be a valuable tool in increasing parent engagement and confirming consistent parent outreach attempts (Wong & Davis, 2022-b).

Part 4: Perspectives on the Success of the Cobb Teaching and Learning System

CTLS was designed to interact with every facet of Cobb's wide-spanning and complex school system in precise and differentiated ways. Because of this, it is not surprising on its face that the initiative's diverse stakeholders hold differing but complementary opinions on how to best measure the success of CTLS. What *is* consistent across stakeholders, importantly, is the prevalent belief that CTLS *is* succeeding, with some room left for growth. In this section, we will examine the metrics often used by various stakeholders to discuss the success of CTLS, and discuss a range of pertinent evidence on CTLS's performance.

Student-Based Measures of CTLS Success:

On average, CCSD has been serving its students well before the full rollout of CTLS in 2020; however, the CTLS initiative has been contributing to CCSD's success in various ways as early as 2014 (see Fig. 6). From Chris Ragsdale's ascendancy to the role of superintendent in 2014 through the beginning of COVID-19 lockdowns in 2020, student academic success indicators show stability or improvement at the district level (GaDOE, 2022-a & 2022-b; GOSA, 2022-a & 2022-b). During the pre-pandemic period, the percentage of students scoring "Proficient" or above on Georgia's End Of Course Milestone tests increased by more than 7% in all subjects (GaDOE, 2022-a; U.S.News, 2022). The district's average composite SAT score stayed relatively stable, while their ACT scores saw a notable 0.6 point average jump (GaDOE, 2022-b; U.S.News, 2022). Notably, Cobb's average SAT and ACT scores during this time

consistently put the district in the top quartile of all districts in the greater Atlanta Metro Area (GaDOE, 2022-a; U.S.News, 2022; see Fig. 7 & Fig. 8).

Fig. 6: Range of academic achievement metrics over time in Cobb County School District from SY 2014-2015 to SY 2021-2022. The SAT score for 2015 represents a different scoring system which, when adjusted to match the system used in other years, does not deviate significantly from the established trend, (GaDOE, 2022-a and 2022-b; GOSA, 2022-a).

Cobb County School District Academic Achievement Metrics 2015-2022

	% Of Student Scoring Proficient or Above on American Literature EOC Assessment	% Of Student Scoring Proficient or Above on Algebra I EOC Assessment	% Of Student Scoring Proficient or Above on Biology EOC Assessment	% Of Student Scoring Proficient or Above on U.S. History EOC Assessment	Average SAT Score	Average ACT Score	4 Year Graduation Rate
2015	50.40%	No Data	53.80%	56.30%	1432*	22.4	78.20%
2016	60.90%	46.70%	61.80%	65.20%	1120	22.6	81.45%
2017	66.30%	50.30%	65.60%	64.90%	1088	22.9	83.80%
2018	65.20%	52.30%	64.30%	71.00%	1107	22.7	83.62%
2019	63.40%	54.20%	66.90%	71.10%	1114	22.3	85.15%
2020	No Data	No Data	No Data	No Data	1107	23	86.98%
2021	34.30%	36.90%	51.70%	37.80%	1150	23.2	88.61%
2022	53.50%	49.90%	58.50%	59.10%	1111	24.3	87.20%

Fig. 7: A map of districts officially considered part of the Atlanta Metro Area. Most rankings and ratings of Cobb County are most meaningful when compared to this region. (Atlanta Regional Commission, 2022)

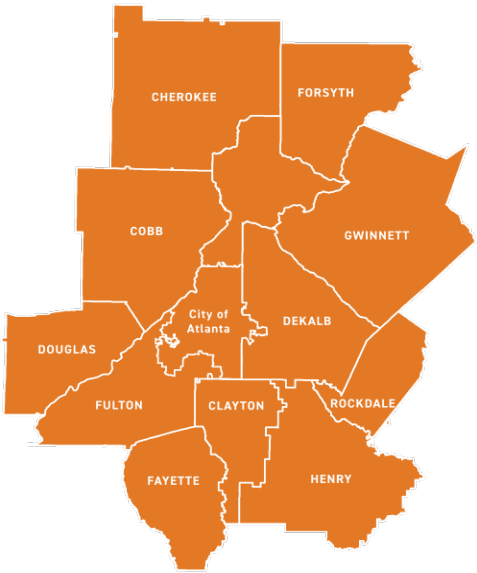
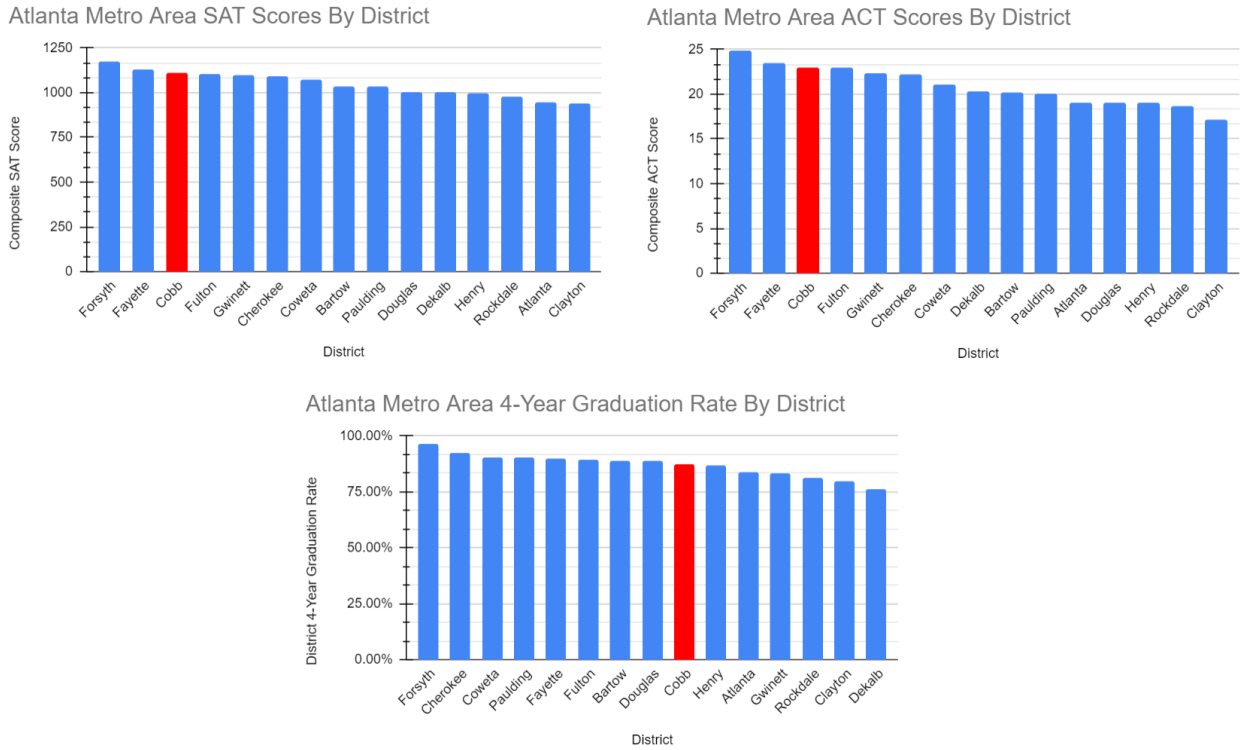


Fig. 8: 2021 SAT and ACT district comparisons. (GaDOE, 2022-b; GOSA, 2022-a)



Meanwhile, CCSD's 4-year graduation rate soared by nearly 9%, bringing them to just under 87% of students graduating on time. This keeps pace with some of their higher-performing neighbors, and easily surpasses a few of their geographic and demographic peers. Still, given Cobb's more extreme levels of success in other areas, graduation rate could still be considered an area for growth despite their recent admirable gains (GOSA, 2022-a).

The existing trend of success and improvement in CCSD makes separating out the quantitative effect of CTLS alone a delicate matter. The modern iteration of CTLS Assess was in use as early as 2018 in some parts of CCSD, with other CTLS utilities undergoing development and pilot testing even earlier. Certain subgroups of Cobb's student population (such as those in the Cobb Virtual Academy and Cobb Horizon High School) had used CTLS and CTLS-like utilities more extensively up to the full rollout than had the rest of the population. Further, when

considering the CTLS initiative as a districtwide shift towards accountability, digitalization, and collaboration, an argument could be made that many aspects of CTLS have been integral parts of Ragsdale's superintendency strategy since 2014.

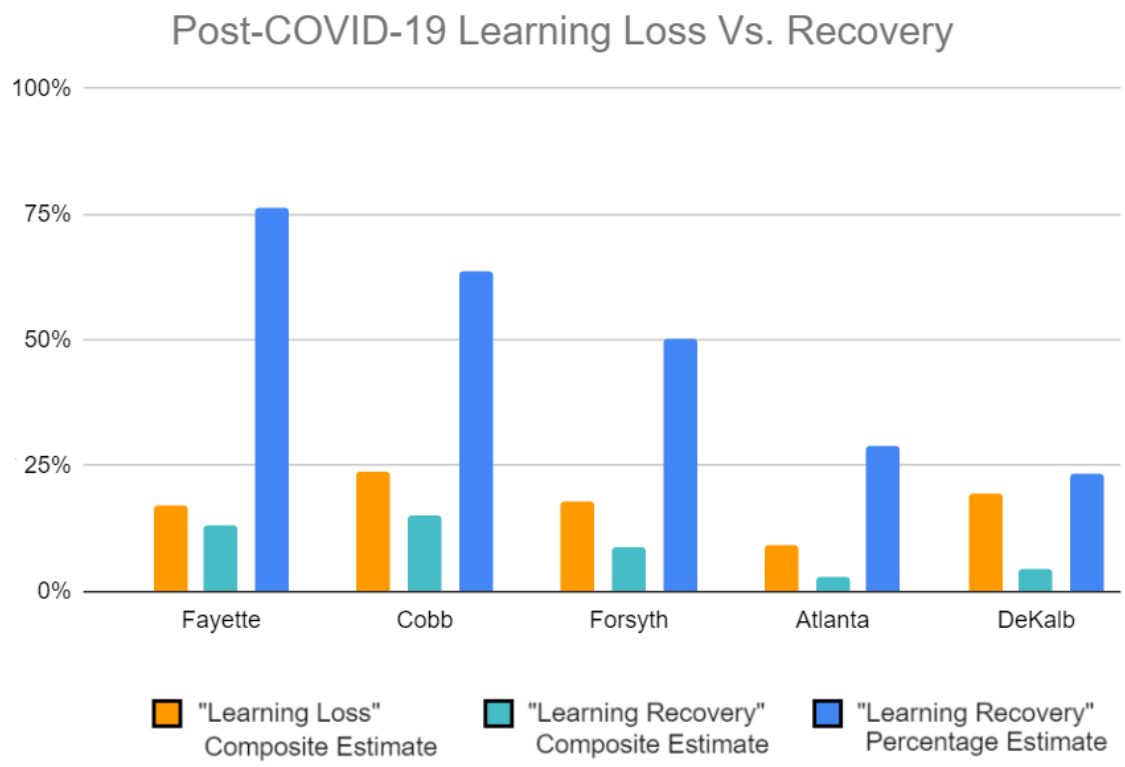
CTLS's central role in CCSD's recovery after the COVID-19 pandemic illuminates the DLE's effectiveness as a tool. While data from the 2019-2020 school year is scarce, data gathered since 2020 indicate a notable push towards learning loss recovery. Cobb's percentage of Georgia Milestone test-takers scoring "Proficient" or above dropped predictably in the cycle directly after the Pandemic, but the *following* cycle saw a 7%-or-higher recovery in all courses; For the U.S. History Course Milestone Test in particular, CCSD saw a massive 21.3% recovery (from 37.8% proficient-or-above population in 2020, up to 59.1% proficient-or-above population in 2021). In fact, testing data indicates that *all* GA Milestone End-Of-Course proficiency levels have already exceeded the 2014 baseline from when Ragsdale entered the superintendency, which was also the first year of statewide Milestone testing (GaDOE, 2022-b; Wong & Davis, 2022-d).

Unlike Milestone scores, Cobb's graduation rate, ACT scores, and SAT scores did not suffer at all during the 2020-2021 school year. Cobb maintained its high SAT score average and its high district ranking- before, during, *and* after the pandemic (GaDOE, 2022-b). Furthermore, ACT scores and graduation rates both managed to *increase* in a post-pandemic Cobb (GaDOE, 2022-b; GOSA, 2022-a).

Looking at district-by-district comparisons, Cobb's learning recovery largely resembles that of some of the consistently higher performing suburban districts in Georgia, as opposed to its closest geographically- and demographically- comparable peers. Based on panel End-Of-Course testing data, high-achieving smaller suburban districts tended to experience high raw

learning loss, but recovered most of this loss in less than 2 years. Meanwhile, lower-performing districts experienced a range of raw learning losses, but in all observed examples have thus far displayed much slower recoveries by composite metrics (see Fig. 9). In essence, CCSD is a high-need school system in a solidly middle class metro area that is recovering in a pattern more similar to Georgia's wealthier areas (Rakesh, Fry & Rohal, 2016; U.S.News, 2022).

Fig. 9: Graph of Learning loss, recovery, and recovery percentage estimates. The base metric is the mean "Proficient-and-Above" percentages for the 4 most-taken Georgia Milestone EOC Assessments (American Literature, Algebra I, Biology, and U.S. History) for SY2019, SY2021, and SY2022. "Learning Recovery Percentage Estimate" is Learning Recovery % of Learning Loss, with a 100% "Learning Recovery Percentage Estimate" suggesting a full recovery from Pandemic learning losses. Here, Cobb is compared to its closest academic peers (Forsyth and Fayette) and its closest geographic/demographic/size peers (DeKalb and Atlanta). (Data derived from GaDOE, 2019, 2021 & 2022-a)



As another concrete example, according to a press release by CCSD at the end of the 2021-2022 School Year, Cobb had the highest percentage of students reading at or above grade

level out of all of its "large metro Atlanta peers," outperforming Fulton County for the title (Riggall, 2022). For reference, Fulton County's median per capita income at this time was nearly $50,000; Cobb's, by contrast, just over $40,000 (US Census Bureau, 2020-a & 2020-c). Meanwhile, Cobb's ACT and SAT scores (as well as various other standardized test scores) are most frequently compared academically to some of Georgia's wealthiest districts, such as Forsyth County with a median per capita income of about $113,000 (US Census Bureau, 2022-b).

It should be noted that CCSD displays a certain degree of stratification in terms of socio-economic status. Higher-performing schools are more likely to be in the Northern part of the county, whereas lower-performing schools tend to be clustered in the Southern part, with Windy Hill Road acting as a recognized soft line of division. Anecdotal evidence from community and parent groups- and even some district management- suggest that CCSD's geographic stratification may also fall along racial lines (Wong & Davis, 2022-e, 2022-r & 2022-y). Currently-available evidence does not suggest that CTLS has changed any of these more entrenched patterns in the short time that it has been rolled out, nor is there significant evidence that it has managed to significantly close achievement gaps or Pandemic-related learning loss recovery gaps. Further, chronic absenteeism has risen steadily since at least 2014 and experienced a sharp 2% jump during the 2020 school year (GOSA, 2022-a). Administrators are aware of the growing absenteeism issue, and link it with the rising number of transient students. While chronic absenteeism may be the exact sort of challenge that CTLS could address, the DLE has not yet had a chance to be fully utilized to this end (Wong & Davis, 2022-s).

Overall, CCSD experienced similar substantial pandemic-related learning losses as its highest-performing peers, as measured by state Milestone assessments. However, CTLS may

well have contributed to Cobb's quick recovery from these losses, with CCSD exhibiting a laudable rebound from 2020 to 2022. In addition, CTLS seems to have played a positive role in stabilizing Cobb's standardized testing rankings and graduation rates in the midst and the wake of the pandemic (See Fig. 7 & Fig. 10). Going into the next phase of CTLS's growth, CCSD could benefit from using the DLE to help combat learning loss caused by the pandemic, particularly in addressing geographically-linked learning gaps and transience-linked rising absenteeism rates.

Educator-Based Measures of CTLS Success:

While student achievement is arguably the most important measure of CTLS's success, evidence of the DLE's efficacy can also be gleaned from its effects on school staff such as teachers and principals. District employees in various categories of staff (from traditional classroom educators to remote educators to school administrators) have anecdotally benefitted from CTLS's many innovative features. The district also promotes deep standardization and quality-control of curricular materials for teachers through CTLS, giving them more time to handle other aspects of their jobs. Most importantly, as previously discussed, CTLS expands CCSD's existing work to create a collaborative community of practice for educators, allowing for increased teamwork and the development of healthy school cultures.

Educators interviewed for this study across grade levels expressed their appreciation for CTLS's success in its reduction of their workload (Wong & Davis, 2022-h & 2022-[u-x]). While CTLS's remote instruction tools were especially useful during the all-remote COVID-19 pandemic, they have now been repurposed to assist with in-classroom instruction as "COVID Keepers". Teachers in Cobb have increasingly come to use CTLS as their instructional anchor,

allowing students new self-pacing, accessibility, and real-time digital assistance options that couldn't have existed in the district previous to CTLS. The DLE also allows for a high level of communication with students, parents, teachers, and administrators alike, streamlining the dozens of disjointed communication hubs into a single district-designed desktop window. According to teachers, the DLE enabled a "higher-than-ever level of collaboration" between school staff both within and outside of their established PLCs. This collaboration is felt most keenly in shared use of learning materials, collaborative lesson development, and ease of communication with fellow teachers (Wong & Davis, 2022-h & 2022-i). There is also qualitative evidence that school principals make frequent use of CTLS's administrator-level organization and communication functions, especially as they relate to parent engagement and scheduling (Wong & Davis, 2022-m).

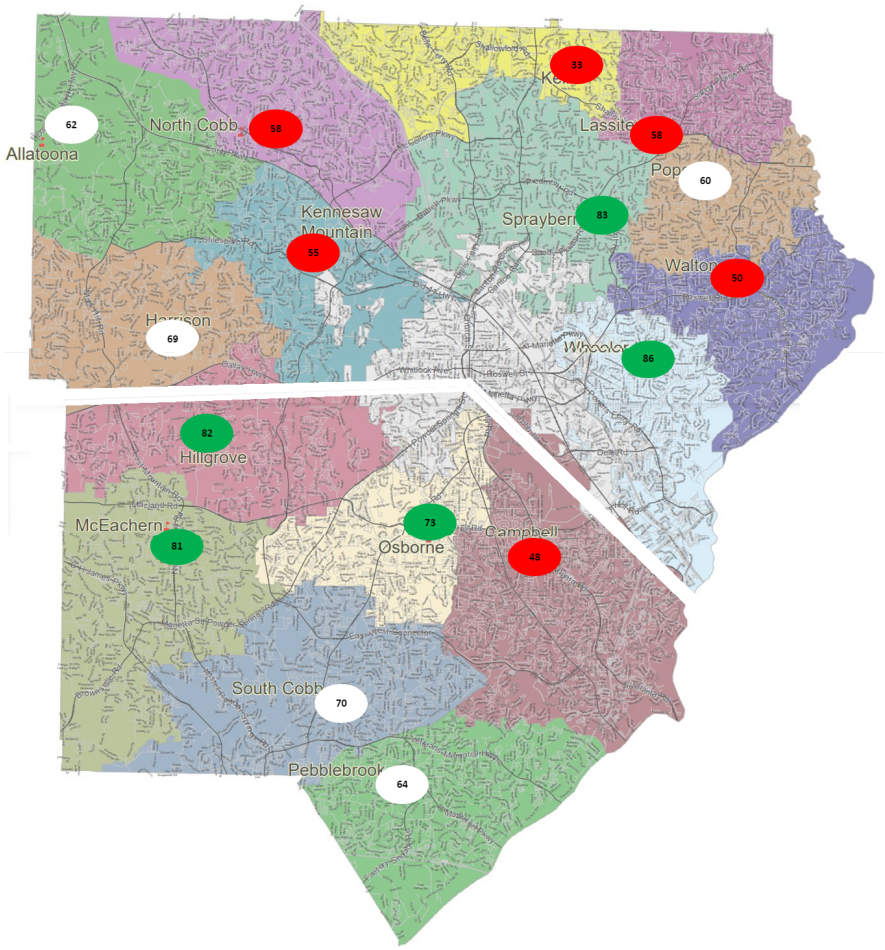
This increase in communication has led to more teacher collaboration in the form of learning object collections, collaborative lesson planning & publishing, and other shared materials. These materials can be organized by teachers however they like, and many Cobb educators have applauded the versatility and customizability of the options available to them through CTLS (Wong & Davis, 2022-i & 2022-x). Possibly the most often cited benefit of CTLS is its ability to automatically generate, collect, analyze, and display data in real time; this is a key feature utilized at every level of the school system from the classroom to the central office (Wong & Davis, 2022-d).

Before the full release of CTLS, the district had struggled with a lack of standardization in its curricula and platforms. This overarching issue produced a number of more specific problems, ranging from widely differing levels of rigor between schools, to frequent disconnects between instructional material and testing material, and to inconsistent school communication

and grading systems. To remedy this, when building the team that would make CTLS a reality, CCSD made sure to recruit provider partners that were able to tailor their services to Cobb's specific set of standards, assessments, and communication needs, building the standards directly into the system. The result is that CCSD has effectively scaffolded their entire teaching profession without meaningfully taking away from the creativity, autonomy, and personal style inherent to the job. This new consistency between educators ensures that every assignment given in CTLS is directly and demonstrably tied to state and district standards, which is now one fewer facet of instruction that teachers need to worry about.

At the time of writing, CTLS has only been mandated as CCSD's primary DLE for two months, but already there is evidence of near-universal teacher adoption (though markedly not proficient use; see Fig. 10). According to the CTLS utilization dashboard, more than 92% of teachers had started using CTLS as of September 2022, with evidence of improving usage proficiency month over month (CCSD, 2022-d). Further analysis may be required at a later time to ascertain the long-term effects of this paradigm shift, but it is likely that CTLS may contribute to a lasting transformation of the district's teaching workforce and a reduction in standards-based learning gaps between schools.

Fig. 10: A map of the attendance zones for Cobb's high schools for the 2022-2023 school year, overlaid with % of teachers utilizing CTLS with "Limited-To-Satisfactory-Proficiency." The white line loosely represents Windy Hill Road's position. Most schools scoring significantly above the median (in green) fall south of Windy Hill Road, while most schools scoring significantly below the median (in red) are in the north. This indicates that CCSD has successfully prioritized the CTLS rollout in the schools that need it most, due in part to the work of TTIS (CCSD, 2021-a)



There are signs that CTLS usage proficiency may be unevenly distributed in unexpected ways, but this could simply be a matter of when the data was collected. Cobb's most academically proficient schools in mathematics and reading exhibit marginally *lower* percentages of CTLS-proficient teachers than lower-performing schools according to September Utilization Dashboard data (CCSD, 2022-d). The average percentage difference in "Limited Proficiency-Or-Above" teachers between these groups (71% vs. 67%) does not appear

anomalously high. It is most likely that CTLS was piloted at the highest-need schools first, or that the rollout priority for CTLS targeted higher-need schools in an attempt to address equity. This is clearly a sound rollout strategy. These utilization numbers are likely to stabilize going forward as more data becomes available and CTLS training becomes even more ubiquitous.

CTLS's developers have taken great pains to involve and value the DLE's end users at every step along the way. The development team incorporates teacher feedback frequently in order to tailor CTLS to their needs. This teacher-prioritizing approach to CTLS improvements has allowed the DLE to morph and shift in ways that are explicitly tied to issues teachers want it to address. In large part because of this development strategy, the district has pulled off a uniquely effective rollout of a radically transformative initiative while maintaining and improving instructional quality along the way. Meanwhile, this "teacher led" methodology has earned a remarkable level of teacher enthusiasm and buy-in, which will be important factors in the DLE's sustained use and the level of teacher proficiency in its utilization (Wong & Davis, 2022-i).

CTLS's features and the policies surrounding the initiative contribute to driving teacher usage of a DLE that can plausibly make them more effective educators. While there is potential for growth as far as the proficiency of teacher utilization of CTLS, teacher adoption trends are promising, and utilization proficiency numbers are improving (CCSD, 2022-d; Wong & Davis, 2022-f, 2022-l & 2022-q). Combined with existing collaborative policies, CTLS is primed to push CCSD into a higher level of teacher collaboration and agency while increasing accountability and rigor. Ultimately, CTLS allows teachers to create customizable curricula- powered by collaboration, perfectly aligned to standards, and automatically generating high quality data- with far less individual time and effort cost involved.

Community-Based Measures of CTLS Success:

Cobb is a diverse community, and this diversity is reflected in the community's estimation of CTLS's effectiveness. Most parents spoken to during the course of this case study have been supportive of the initiative and happy with the newfound access to their children's education that it allows. Nevertheless, a vocal subset of parents has also spoken out about certain concerns which they feel inhibit the utility of CTLS in their lives and that of their children. Ultimately, a lack of data hinders the ability to make a solid case one way or another at this time.

Some parents argue that CTLS has facilitated improved parent interaction with teachers both in terms of amount and quality (Wong & Davis, 2022-t). Indeed, CTLS Parent gives district parents unprecedented options for involvement in their children's education. Parents cite the ability to easily contact teachers as one CTLS Parent's most useful and oft-utilized features (Wong & Davis, 2022-b, 2022-t & 2022-y). Furthermore, parents had an overall positive opinion of CTLS Parent's utilities in grade-checking, scheduling, verification of student work completion, attendance-tracking, and crisis alert notification (Wong & Davis, 2022-b, 2022-t & 2022-y). When it came to their students' use of CTLS, parents were especially vocal about how CTLS minimized the negative effects of school absences and transiency, which is a viewpoint shared by classroom teachers as well (Wong & Davis, 2022-t). In concrete terms, the district is utilizing CTLS Parent very frequently, and parents are engaging with the CTLS Parent module themselves with consistency. Between 2020 and the start of 2022, CCSD sent out almost 74 million individual notifications to parents using the CTLS Parent platform alone. Based on rough estimates derived from Office of Communications internal documents, parents may be actively viewing these communications 55-60% of the time; given that the district sends out parent

communications multiple times a week on average, this is a high prospective level of parental engagement (CCSD, 2022-f). CTLS Parent has enabled CCSD's efforts to engage parents at scale.

Not surprisingly, not all parents are as enthusiastic about CTLS. Some parents (especially those in higher-need schools) were less enamored with CTLS's handling of absences than other parents in lower-need schools. One parent in particular stated that, "[Parents] can check attendance in CTLS but there are limits to what the school can do [about it]... in the end, [responsibility for] attendance lies with the parents" (Wong & Davis, 2022-y). Furthermore, messages pertaining to CTLS updates are sent out via a districtwide "blast" quarterly; however, parents interviewed for this report found that important communications on CTLS's updates and features were not clear, effective, frequent, or timely (Wong & Davis, 2022-m, 2022-t & 2022-y). Some parents were similarly nonplussed with the district's handling of parent communication during CTLS's initial rollout. Part of this issue was chalked up to language barriers, which is perplexing considering that CTLS Parent includes an inbuilt text translator- the existence of which was, ironically, inconsistently communicated to the parents who would need it most (CCSD, 2022-b; Wong & Davis, 2022-c). Nonetheless, parental concerns suggest the need for ongoing communication and parental training so that parents will become better informed about CTLS functions (Wong & Davis, 2022-t & 2022-y).

Parents and teachers also expressed that CTLS's effectiveness relies heavily on which teachers one's child is assigned; a teacher well-versed in CTLS can be transformational for a student. Interestingly, the utilization dashboard demonstrates that the schools with high percentages of teachers highly competent in CTLS are clustered South of Windy Hill Road, focused specifically at some of the traditionally lowest-performing schools in Cobb (Wong &

Davis, 2022-m & 2022-[t-y]; see Fig. Zeta). This pattern suggests that the district is well aware of the correlation between CTLS adoption/utilization and transformative education, and it is encouraging that CCSD has apparently chosen to focus on higher-need schools first.

While the critical opinions of a handful of parents have been discussed here, a lack of collected and organized data keeps these opinions from coalescing into something more substantial, but the issues addressed are nonetheless actionable. Suffice to say that there are clear strengths to CTLS as identified by the broader parent community, as well as equally clearly identified areas for further research and growth.

Technical & Structural Measures of CTLS Success:

It is worthwhile to consider the aspects of CTLS's success defined by the technological achievement that it represents. CTLS's digital infrastructure is a marvel, deftly weaving disparate modules together in a virtually seamless way through both form and function. The system allows for the storage, creation, interaction, and synthesis of data originating from many sources, with the capability to incorporate novel sources of data in the future. CCSD has managed to arrange this ecosystem in such a way that losing a partner for some reason wouldn't doom the entire system; this is where "For Cobb, By Cobb" comes most into play. "The district owns the content [of CTLS]", states the Chief Strategy and Accountability Officer, inferring that- while there is no reason to believe that a breakdown in partnership would occur- having that content ownership gives the district a sense of stability with CTLS that couldn't be offered by a traditional SaaS-constructed DLS In brief, CTLS is simultaneously experientially integrated but technically modular, making it both impressively powerful and surprisingly versatile.

The current hardware that runs CTLS is provided by the district and partners jointly. Each partner utilizes their own servers alongside Cobb's, allowing for a high-capacity disaggregated infrastructure that serves CTLS reliably. With heavy focus on data security, program uptime, and digital collaboration, CTLS is remarkably safe and stable considering its level of complexity (Wong & Davis, 2022-q). The district carefully considers partners' capacities to safely handle data within CTLS's network structure before any actual data is exchanged. This has allowed for a strategic distribution of capacity load and an overall sense of digital safety for all involved (Wong & Davis, 2022-p & 2022-q).

In terms of system uptime, CTLS has proven its capability in the most extreme of circumstances, in large part. Network officials and partners proudly allege that while neighboring districts experienced intermittent system downtimes lasting full days early in the pandemic, CCSD had a single initial crash lasting only a couple of hours before being quickly put back online. According to these sources, the system has been up and running as intended ever since, barring short planned periods for maintenance and improvement (EdIncites, 2022; Wong & Davis, 2022-a & 2022-q). Representatives of the district say that such positive experiences with the network are no accident; they are the intentional effect of the strong technical collaboration between the CTLS development team, CTLS's partners, and CCSD's Department of Technology Services.

Part 5: Policy Implications and Future Research

Summary of Findings:

The CTLS initiative has earned the confidence of stakeholders in the Cobb County School District. With its innovative focus on enabling collaboration, its strategically-crafted management structure, its collection of bespoke user-oriented features, and its integration into a web of other district policies tailored to optimize its rollout and effectiveness, CTLS is a digital learning environment that delivers real-world, real-time effects. The initiative is demonstrably effectively designed to produce improvement in Cobb's education system for students, school staff, and the community at large. The overall response to the DLE from the end users that it is intended to serve has been overwhelmingly positive so far. Furthermore, many preliminary quantitative metrics support the claim that aspects of the CTLS initiative may have helped Cobb to achieve and maintain its current standing as one of the most successful school districts in the state (Niche, 2022). This is especially impressive given the district's large size, high level of diversity, and unremarkable district wealth compared to its metropolitan neighbors.

The success of CTLS seems to derive as much from the circumstances surrounding the DLE as from the DLE itself. Cobb County had been primed for a transformational change in 2014 by its four previous years of stability (George, 2014). Superintendent Ragsdale was appointed to his role because of his transformational vision, and he took advantage of multiple opportunity windows in order to lead the district into creating what they proudly hail as "the ultimate tool unifying teaching & learning" (CCSD, 2022-b). CCSD's existing policies regarding PLCs, district collaboration norms, and alternative learning pathways for students set the foundation for a smooth rollout. Meanwhile, a high level of teacher buy-in and a world-

stopping pandemic provided the fuel that Ragsdale needed to see the vision for CTLS to its current stage of completion. Clearly, the "For Cobb By Cobb" commitment, strategic decisions, implementation strategies, and sustaining partnership in advancing CTLS offer useful lessons for large districts that are ready to launch their transformative digital learning initiatives.

Areas For Continuous Improvement:

The initiative, despite its many strengths, could undertake continuous improvement in two areas: broadening learning opportunities across CCSD, and improving communication about CTLS to the larger Cobb community, especially parents across the district. While CTLS appears to contribute to positive, district average effects and trends for CCSD's students, these effects and trends may not be evenly distributed across (or even within) schools. Uneven effects could be due to the short time that CTLS has been fully rolled out in its current iteration, but parent groups in particular note that the full effects of CTLS have not yet been realized by students in high-need groups such as students with special needs and English language learners. A more in-depth analysis of the effect of CTLS on these groups may be beneficial to further optimizing learning opportunities. There is no doubt that the district is actively moving in the right direction in serving these groups.

On a student-by-student basis, CTLS's development team and end users agree that the DLE is uniquely well-suited to differentiated instruction (Wong & Davis, 2022-[u-x]). Teachers can differentially assign work, grade assignments, create work groupings, and communicate directly and privately with students within CTLS with precision and ease. This allows students to receive high levels of individualized attention without an unrealistic level of expertise or burnout-inducing extra work time for the teacher. Expanding this focus could be invaluable in supporting students with special needs; this subgroup is widely recognized as prone to

disruption-triggered learning loss (such as that caused by the COVID-19 pandemic) and generalized education inequity (Cooc & Kiru, 2018; Redenius, 2021). Evidence suggests that CTLS already facilitates the engagement and differentiated instruction of students with special needs in some classrooms, with teachers citing increased participation, increased engagement, and better academic performance for students with special needs (Davis, 2022-b; Wong & Davis, 2022-h, 2022-i & 2022-n). CTLS's development team and partners have already discussed a shared desire to further expand this capability (Wong & Davis, 2022-a, 2022-d & 2022-[h-j]). A targeted approach to both the expansions of these capabilities, and the study of the expansion's effects, could add a great deal of additional strength and utility to CTLS as a transformational initiative.

Improving parental communication is another area of continuous improvement. Even parents who consider themselves active users of CTLS Parent often miss out on key features of the module, and display a more acute unawareness of the features and processes in CTLS Learn, CTLS Teach, and CTLS Assess. This lack of knowledge has led some parents to deem their children's schools as "parent unresponsive". Given the district's heavy investment in CTLS Parent, however, this is cause for concern even if parents are generally supportive of the CTLS initiative overall. An increased focus on effective parent communication could remedy this issue. A possible stopgap measure could be the increase of CTLS feature update messages going out to parents on a monthly basis, rather than quarterly. This would also act to reduce the length of these messages, which could increase their readership and retention.

Need for Ongoing Monitoring Study:

When taken as a whole, the available data provide solid evidence on CTLS accomplishments. At the same time, there is a need for an ongoing, monitoring study. CTLS

has only existed at all since 2014, and the full rollout only occurred in 2020. Superintendent Ragsdale's mandate elevating the DLE's use to universality occurred during the research phase of this case study. Furthermore, with the advent of the CTLS Utilization Dashboard and new real-time data being generated for the district every day, future analyses of the CTLS program will necessarily have a lot more data to work with. State-level datasets from the 2020-2021 and 2021-2022 school years are also severely limited due to the COVID-19 pandemic. As CTLS continues to evolve, CCSD will need to continue to monitor its implementation and effects on teaching and learning, including the distribution of learning opportunities for all students.

The Future Of the Cobb Teaching & Learning System Initiative:

Throughout Cobb County, there are teachers, students, and school leaders who believe (rightfully) that the current version of CTLS is a singular feat of technology, with some stating that they "can't think of anything that [the district] missed" in the development process. However, the CTLS initiative is a growing set of programs with many improvements and additions already in the works. Widening the release of the CTLS Utilization Dashboard and the planned expansion of the TTIS program are obvious next steps, but they are just the beginning of what could be on the horizon. CCSD and its partners are working on technical improvement and upgrades such as student portfolios with fully integrated gradebooks, a new simplified interface for students in the lowest grades, a CTLS phone application for student use, and computer-adaptive testing (Wong & Davis, 2022-d & 2022-q). Meanwhile, district management is exploring the leveraging of existing CTLS tools to support non-core classes, preliminary student intervention using predictive data, and improvements to data archiving and security (Wong & Davis, 2022-a & 2022-q). There is also the potential of trying to spread CTLS's collaborative

digital model beyond Cobb itself, inspiring and guiding transformations in their neighbors for the benefit of Georgia as a whole (Wong & Davis, 2022-d & 2022-q).

Whatever future direction CCSD chooses to take the initiative, the core principles of "For Cobb, By Cobb," professional collaboration, and integrated technology that accounted for its success will likely continue enabling them towards academic excellence long into the district's future. Equally important, this case study has highlighted how CCSD successfully maintains complete ownership in a customized digital learning initiative supported by technology providers. Clearly, CCSD's experience in scaling CTLS offers useful lessons for districts that are ready to launch and to own their transformative digital learning environment.

Appendix I: Works Cited

BIS. "What Is A Learning Management System". BIS Safety Software. 2022. Accessed at: https://www.trainanddevelop.ca/blog/the-history-of-distance-learning-and-the-lms/

Blundell, Christopher; Lee, Kar-Tin; & Nykvist, Shaun. "Digital learning in schools: Conceptualizing the challenges and influences on teacher practice". Journal of Information Technology, Education, & Research. Issue 15, pp. 535-560. 2016. Accessed at: https://eprints.qut.edu.au/222016/

Cobb County School District. “Cobb County School District High School Attendance Zones”. CCSD Archive Website. 2021-a. Accessed at: https://sbcobbstor.blob.core.windows.net/media/WWWCobb/medialib/a990c718920.pdf

Cobb County School District. “End Of Year Cumulative Annual Fiscal Report [‘21]”. CCSD Website. 2021-b. Accessed at: https://sbcobbstor.blob.core.windows.net/media/WWWCobb/medialib/fy21-electronic-cafr-with-single-audit.f2330167882.pdf

Cobb County School District. "About - The District". CCSD Website. 2022-a. Accessed at: https://www.cobbk12.org/page/285/the-district

Cobb County School District. “CTLS”. CCSD Website. 2022-b. Accessed at: https://www.cobbk12.org/page/47235/ctls

Cobb County School District. "Learning Everywhere". CCSD Website. 2022-c. Accessed at: https://www.cobbk12.org/learningeverywhere

Cobb County School District. "Master Data Flow Schematic". Unpublished Presentation Slide. 2022-d. Accessed via internal document.

Cobb County School District. "Utilization Dashboard Output Demo". Unpublished output. 2022-e. Accessed via internal document.

Cobb County School District. "Years 2020-2022 Cobb Data from the Communications Office - CTLS Parent”. Unpublished output. 2022-f. Accessed via internal document.

Cooc, North & Kiru, Elisheba. "Disproportionality in Special Education: A Synthesis of International Research and Trends". The Journal of Special Education. 2018. Accessed at: https://journals.sagepub.com/doi/abs/10.1177/0022466918772300

Dalton, Martha. "Cobb County School District Names New Superintendent". WABE. 2015. Accessed at: https://www.wabe.org/cobb-county-school-district-names-new-superintendent/

EdIncites. "Acceleration Academies Selects the Incite Teaching & Learning Platform from EdIncites to Power its National Student Re-Engagement Programs". EdIncites. 2021. Accessed at: https://educationincites.com/acceleration-academies-selects-the-incite-teaching-learning-platform-from-edincites-to-power-its-national-student-re-engagement-programs/

Georgia Department of Education. "Georgia Milestone Assessment System, 2019 Data". GaDOE Website. 2019. Accessed at: https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Georgia-Milestones-Assessment-System.aspx

Georgia Department of Education. "Georgia Milestone Assessment System, 2021 Data". GaDOE Website. 2021. Accessed at: https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Georgia-Milestones-Assessment-System.aspx

Georgia Department of Education. "Georgia Milestone Assessment System, 2022 Data". GaDOE Website. 2022-a. Accessed at: https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Georgia-Milestones-Assessment-System.aspx

Georgia Department of Education. "SAT and ACT Results". GaDOE Website. 2022-b. Accessed at: https://www.gadoe.org/Curriculum-Instruction-and-Assessment/Curriculum-and-Instruction/Pages/SAT-and-ACT-Results.aspx

Governor's Office of Student Achievement. "Downloadable Data". State of Georgia. 2022-a. Accessed at: https://gosa.georgia.gov/dashboards-data-report-card/downloadable-data

Governor's Office Of Student Achievement. "What is Digital Learning?". Georgia.gov. 2022-b. Accessed at: "https://gosa.georgia.gov/about-us/what-digital-learning#:~:text=Digital%20Learning%20is%20"learning%20facilitated,day%20or%20the%20school%20year.

GreatSchools. “Georgia > Marietta > Cobb County School District”. GreatSchools Website. 2022. Accessed at: https://www.greatschools.org/georgia/marietta/cobb-county-school-district/#:~:text=A%20larger%20number%20of%20schools,above%20average%20in%20school%20quality.&text=State%20Avg.&text=These%20are%20some%20of%20the,including%20academic%20performance%20and%20equity.

Kania, John & Kramer, Mark. "Collective Impact". Stanford Social Innovation Review. 2011. Accessed at: https://senate.humboldt.edu/sites/default/files/senate/Chair%20Written%20Report%201-23-2018.pdf

Knowly. "History of LMS". Easy-LMS B.V.. 2022. Accessed at: https://www.easy-lms.com/knowledge-center/lms-center/history-of-lms/item10401#:~:text=The%20first%20LMS%20was%20developed,window%20that%20could%20administer%20questions.

Niche. "Cobb County Schools - 16th Best School District In Georgia". Niche.com Inc. 2022. Accessed at: https://www.niche.com/k12/d/cobb-county-schools-ga/

Rakesh, Kocahar; Fry, Richard; and Rohal, Molly. "America's Shrinking Middle Class: A Close Look at Changes Within Metropolitan Areas". Pew Research Center. 2016. Accessed at: https://www.pewresearch.org/social-trends/2016/05/11/americas-shrinking-middle-class-a-close-look-at-changes-within-metropolitan-areas/

Redenius, Tara. "Serving Students with Special Needs during COVID-19 Pandemic". NWC Commons. 2021. Accessed at: https://nwcommons.nwciowa.edu/education_masters/300/

Riggall, Chart. "State test scores show mixed results in Cobb, Marietta schools". Marietta Daily Journal. 2022. Accessed at: https://finance.yahoo.com/news/state-test-scores-show-mixed-223800953.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAGAc47XEGu0mi2Uf3IACfg6YvC2K1OVfQvZRDfmEB8SbZ_D9F2TqCfRGT5A2iAAOvugHwz_onRkWr-f9q-WnpXZk9UMVgs9FTjw8HGFb_cu4f8NCXXShHR7E1pvsxjyY0na6ZVPI2niO0DJmhAMWJ-k8x3ccD0bNeN-vZF_BqI9m

Rumble, Kyle. "Education Incites® Acquires EduTrax". EdIncites Website. 2018. Accessed at: https://educationincites.com/education-incites-acquires-edutrax/

Scamihorn, Randy. "The Chairman's Brief: Keeping Cobb on Top with Superintendent Chris Ragsdale". CCSD Website. 2021. Accessed at: https://www.cobbk12.org/_ci/search?q=the%20chairman%27s%20brief%20ragsdale

Sclater, Neil. "A Large-scale Open Source eLearning Systems at the Open University". Educase. Archived from the original on 26 July 2012. 2012 ed. Accessed at: https://archive.ph/20120726133033/http://connect.educause.edu/Library/Abstract/LargeScaleOpenSourceELear/46878

Smith, Marc. "Cloud Hosted Vendor Information Security Questionnaire". CTLS Archives. 2015 ed. Accessed via internal document.

Smith, Kelsey. "The First LMS". WorldManager. 2019. Accessed at: https://www.worldmanager.com/resources/first-lms/

Townsend, Starla. "Innovation Roadmap 2022". Unpublished Document. 2022 ed. Accessed via internal document.

US Census Bureau. "QuickFacts: Cobb County". United States Government. 2020-a. Accessed at: https://www.census.gov/quickfacts/cobbcountygeorgia

US Census Bureau. "QuickFacts: Forsyth County". United States Government. 2020-b. Accessed at: https://www.census.gov/quickfacts/forsythcountygeorgia

US Census Bureau. "QuickFacts: Fulton County". United States Government. 2020-b. Accessed at: https://www.census.gov/quickfacts/fultoncountygeorgia

U.S. News. "High Schools in Cobb County School District". U.S. News Website. 2022. Accessed at: https://www.usnews.com/education/best-high-schools/georgia/districts/cobb-county-school-district-106759

Appendix II: List Of Interview and Observation Sessions (with Citations)

Wong, Kenneth and Davis, Spencer. "Zoom Interview with EdIncites Leaders." Unpublished Interview. 9/8/2022-a.

Wong, Kenneth and Davis, Spencer. "Zoom Interview with Manager of CTLS." Unpublished Interview. 9/15/2022-b.

Wong, Kenneth and Davis, Spencer. "Zoom Interview with Manager of Assessment." Unpublished Interview. 9/16/2022-c.

Wong, Kenneth and Davis, Spencer. "Interview with Assistant Superintendent & Chief Strategy and Accountability Officer." Unpublished Interview. 9/22/2022-d.

Wong, Kenneth and Davis, Spencer. "Interview with Chief Strategy and Accountability Officer." Unpublished Interview. 9/22/2022-e.

Wong, Kenneth and Davis, Spencer. "Kennesaw Elementary School Visit." Unpublished Interview. 9/22/2022-f.

Wong, Kenneth and Davis, Spencer. "Observation of Presentation by a TTIS Member." Unpublished Observation. 9/22/2022-g.

Wong, Kenneth and Davis, Spencer. "Class Observation and Discussion with Assistant Director of EVP." Unpublished Interview. 9/22/2022-h.

Wong, Kenneth and Davis, Spencer. "EVP 1st Grade Team Interview." Unpublished Group Interview. 9/22/2022-i.

Wong, Kenneth and Davis, Spencer. "Debrief, Demo, and Middle School Class Observations with Instructional Technology Staff." Unpublished Debrief Session. 9/22/2022-j.

Wong, Kenneth and Davis, Spencer. "Interview with TTIS Member." Unpublished Interview. 9/22/2022-k.

Wong, Kenneth and Davis, Spencer. "Continued Interview and CTLS Demo with Instructional Technology Staff." Unpublished Interview. 9/22/2022-l.

Wong, Kenneth and Davis, Spencer. "Meeting with Tritt Elementary Principal." Unpublished Interview. 9/23/2022-m.

Wong, Kenneth and Davis, Spencer. "Observation of CVA Classrooms." Unpublished Observations. 9/23/2022-n.

Wong, Kenneth and Davis, Spencer. "Meeting with CVA Leadership." Unpublished Interview. 9/23/2022-o.

Wong, Kenneth and Davis, Spencer. "Meeting with Communication Officer." Unpublished Interview. 9/23/2022-p.

Davis, Spencer. "Site Visit Debrief with Instructional Technology Staff." Unpublished Debrief Session. 9/23/2022-a.

Davis, Spencer. "Observation and Interview with High School Science Teacher." Unpublished Interview. 9/23/2022-b.

Wong, Kenneth and Davis, Spencer. "Zoom Interview with Network Officer." Unpublished Interview. 9/27/2022-q.

Wong, Kenneth and Davis, Spencer. "Interview with Representative from the Cobb Schools Foundation." Unpublished Interview. 11/3/2022-r.

Wong, Kenneth and Davis, Spencer. "Follow-up Interview with Chief Strategy and Accountability Officer." Unpublished Interview. 11/3/2022-s.

Wong, Kenneth and Davis, Spencer. "Interview with CCSD Parent." Unpublished Interview. 11/3/2022-t.

Wong, Kenneth and Davis, Spencer. "Observation of CCSD Teacher." Unpublished Observation. 11/3/2022-u.

Wong, Kenneth and Davis, Spencer. "Observation of CCSD Teacher." Unpublished Observation. 11/3/2022-v.

Wong, Kenneth and Davis, Spencer. "Observation of CCSD Katy Hunt." Unpublished Observation. 11/4/2022-w.

Wong, Kenneth and Davis, Spencer. "Observation of CCSD Teacher." Unpublished Observation. 11/4/2022-x.

Wong, Kenneth and Davis, Spencer. "Interview with High School PTSA President." Unpublished Interview. 11/4/2022-y.

Wong, Kenneth. "Interview with Director of Instructional Technology." Unpublished Interview. 11/7/2022

Appendix III: Glossary of Abbreviations, Acronyms, & Terms

Term:	***AKA:***	***Definition:***
Entity: Education Incites	EdIncites	A company that develops, maintains, and distributes digital educational products for Assessment, Instruction, Learning, and Course Management among other areas. Their flagship line is the Incite® line of products; Incite® Classroom, Incite® Assessment, and Incite® Professional. The addition of integrated third party add-ons Incite® Parent and Incite® Resources gives them the ability to offer an entire Digital Learning Environment to clients.
Entity: Learning Explorer		A company that provides advanced standards-aligned highly-customized Learning Object Repository services to districts. Sister-company to Lesson Planet.
Entity: Lesson Planet		A company that provides Learning Object Repository services to schools and teachers directly, with some dabbling in district-level service. Sister-company to Learning Explorer.
Entity: ParentSquare		A company that provides secure communication services- such as real time digital messaging, calling, email, and push notifications- between students, parents, teachers, and administrators, as well as providing parent interfaces to increase parent involvement in education.
Initiative: 2014 Cobb Teaching and Learning System Initiative	CTLS	Cobb County's novel integrated digital learning environment
Initiative: 2018 Cobb Horizon High School	Horizons	An alternative hybrid high school meant as a non-punitive alternative to traditional high-schools. The Cobb On-Line Learning Academy is operated as a separate entity from this building.
Initiative: 2020	COLA	A fully-remote program that develops, distributes, tracks,

Term:	***AKA:***	***Definition:***
Cobb On-Line Learning Academy		and directly instructs synchronous classes for students in middle and high school.
Initiative: 2020 Technology Training and Integration Specialist Initiative	TTIS	A group of technologically-inclined instructional support coaches who give professional development presentations, offer in-classroom support, answer teacher questions, participate in community outreach, and help to smooth the district's technological transitions. Each Technology Training and Integration Specialist is assigned to 3-4 schools and works on-site at all of them periodically while offering support remotely to all of them simultaneously. Created as a way to bridge pandemic- and post-pandemic learning.
Initiative: 2022 Student Laptop Program	1:1 Laptops	At the lower school and middle school levels, laptops are kept in each classroom and do not leave these assigned classrooms. There are enough laptops for simultaneous use by every student. At the high school level, each student can request a laptop to loan for the duration of the school year for free, and for Summer Program use at a small charge. However, the usage of these laptops is heavily regulated, and the consequences for loss or some types of damage are relatively high. Only 75% of high school students subscribe to this program even though all classes require computer access.
Initiative: Cobb Virtual Academy	CVA	A fully-remote program that develops, distributes, and tracks asynchronous classes for students. These courses are run out of Kennesaw Elementary School.
Initiative: Elementary Virtual Program	EVP	A fully-remote program that develops, distributes, tracks, and directly instructs synchronous classes for students in elementary school, primarily high need populations.
Term: Course Management System	CMS	A digital service that facilitates the creation, distribution, and grading of assignments.
Term: Digital Learning Environment	DLE	A single digitally-facilitated educational system that integrates different CMS, LMS, LOR, and/or Specialized Digital Learning Tool components into a single uniform core conceptual/digital framework in order to provide a comprehensive digital space for end users.
Term: Digital Learning	DLS	A single digitally-facilitated educational system that utilizes different CMS, LMS, LOR, and/or Specialized

Term:	***AKA:***	***Definition:***
System		Digital Learning Tool components in order to provide a digital learning to end users.
Term: Learning Management System	LMS	A digital service that facilitates the creation, distribution, and grading of assignments, as well as direct instruction and student interaction; often, this includes a real-time messaging and video component.
Term: Learning Object Repository	LOR, Digital Resource Library, Content Library	A digital service that aggregates, catalogs and categorizes digital content for use in digitally-facilitated courses.