Miami-Dade County Public Schools

Internal Audit Report

Audit of the District's Readiness and Capabilities in the Acquisition and Implementation of a Large-Scale Instructional Technology Platform

The six-week timeframe attempted to implement the K12 instructional technology platform was decidedly insufficient to meaningfully adhere to standards and practices that would be required in a successful implementation.

March 2021

THE SCHOOL BOARD OF MIAMI-DADE COUNTY, FLORIDA

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Miami-Dade County Public Schools

giving our students the world

Superintendent of Schools
Alberto M. Carvalho

Chief Auditor
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March 1, 2021

The Honorable Chair and Members of The School Board of Miami-Dade County, Florida
Members of The School Board Audit and Budget Advisory Committee
Mr. Alberto M. Carvalho, Superintendent of Schools

Ladies and Gentlemen:

We have performed an audit to determine the District's readiness and capabilities in the acquisition and implementation of a large-scale instructional technology platform. This audit was performed at the direction of the School Board, pursuant to Good Cause School Board Agenda Item H-14 Revised that was approved unanimously by the Board at its meeting of September 9, 2020. This agenda item was initially proffered by School Board Member Ms. Mari Tere Rojas and co-sponsored by the Honorable Board Chair Mrs. Perla Tabares Hantman, Board Vice-Chair Dr. Steve Gallon III, Board Member Dr. Dorothy Bendross-Mindingall and former Board Member Ms. Susie Castillo.

This audit resulted in four findings and corresponding recommendations which draw conclusions about the acquisition and implementation of the K12 technology platform in use during the first two weeks of the 2020-2021 school year. In addition, this audit recognizes the significant rise in cybersecurity activities and related technology issues both globally and locally; as well as a trend of enhanced corporate governance for technology in both the private and public sectors through the establishment of board-level technology advisory committees.

We would like to thank the Administration and District offices that participated in this audit for their cooperation and courtesies extended to our staff.

Sincerely,

Maria T. Gonzalez, CPA
Chief Auditor
Office of Management and Compliance Audits

MTG:jg

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EXECUTIVE SUMMARY

This audit was conducted pursuant to Good Cause School Board Agenda item H-14 Revised that was approved at the School Board meeting of September 9, 2020, and responsive to the District's acquisition/implementation of the K12 technology platform/curriculum and the related problematic opening of the 2020-2021 school year the week of August 31, 2020. The objective of the audit was to determine the District's readiness and capabilities in the acquisition and implementation of a large-scale instructional technology platform.

We found that the District's Administration was not adequately prepared to use the K12 instructional technology platform for its remote learning necessitated by the COVID-19 pandemic at the opening of the 2020-2021 school year. Numerous instructional and information technology standards and industry practices describe a process and timeframe for implementing such instructional technology. In starting the implementation of K12 during July 2020, with a "go-live" deadline of August 31, 2020, we found that this six-week period was decidedly insufficient to meaningfully adhere to standards and practices that would be required in a successful implementation.

Prior to the acquisition and implementation of the large-scale instructional technology platform that is the focus of this audit (i.e., K12), the District was in the process of acquiring a learning management system (LMS) separate and distinct from the acquisition of the K12 LMS platform in July 2020. Regarding this system, we found that the planning and procurement for RFP 19-26-CM *School Information System/Learning Management System* appears to be in adherence with applicable standards and expected protocols thus far. RFP 19-26-CM was issued in November 2019, prior to the COVID-19 pandemic and related state of emergency, and its procurement was recently approved via School Board Agenda Item E-146 of the February 10, 2021, meeting.

Our audit also recognizes and concludes that the use of instructional and information technology, as well as cybersecurity issues and activity, have dramatically risen both globally and locally to this point in time, and the technology and cybersecurity environment is in a constant state of flux and evolution. We recommend consideration be given to the establishment of a School Board technology advisory committee for purposes of:

a. Supporting the School Board in the discharge of its governance duties involving all matters of technology and cybersecurity, and

b. Leveraging the extensive talent, expertise, and generous public service culture of the local community.

The audit resulted in four findings and corresponding recommendations. Findings one, two and three are presented herein with corresponding responses from Management. The specific technical details of the last finding have been omitted from this report to

safeguard the system pursuant to Section 281.301, Florida Statutes, *Security Systems; Records and Meetings Exempt from Public Access or Disclosure.*

Management's responses to the findings (and recommendations) one, two and three are included on pages 12 through 18 following each individual finding, and in memorandum format as received by our office starting on page 21. Finding number four, in its condensed format, is included on page 19. We have also included a glossary of technical terms and acronyms on page 20.

BACKGROUND

On Friday, March 13, 2020, the Superintendent of Schools invoked School Board Policy 8420 and declared an emergency closure of all schools effective Monday, March 16, 2020, due to the rapid escalation of the Coronavirus (COVID-19) pandemic outbreak. The District then began remote instruction with tools such as Microsoft Office Teams and Zoom from the emergency declaration to the end of the school year.

Over the summer, it became clear that students in Miami-Dade County would not be able to fully return to face-to-face learning for the opening of the new school year. On July 6, 2020, an Executive Order (DOE-2020-EO 06) was filed by the Commissioner of Education Mr. Richard Corcoran to accomplish four main objectives:

1. Reopen brick and mortar schools with the full panoply of services for the benefit of Florida students and families;
2. Suspend and adjust as necessary reporting requirements to ensure appropriate monitoring and financial continuity of the educational process;
3. Retain high quality school choices for Florida students and families with a focus on eliminating achievement gaps, which may have been exacerbated by the crisis and;
4. Maintain services that are legally required for all students, such as low income, English language learning, and students with disabilities.

The Executive Order states that all school districts must include "in-person instruction (barring a state or local health directive to the contrary), specialized instruction and services for students with Individualized Education Programs (IEPs) or live synchronous or asynchronous instruction with the same curriculum as in-person instruction and the ability to interact with a student's teacher and peers as approved by the Commissioner of Education". Essentially, districts that complied with these requirements would receive state funding in Fall 2020 based on previously projected rather than actual enrollment.

Prior to the COVID-19 pandemic, the District had issued a Request for Proposal (RFP) on November 20, 2019, to acquire a Learning Management System (LMS) that included the capability of distance learning on a mass scale. This RFP process was slated to take at least a year to acquire and implement, which was not in time for the beginning of the 2020-2021 school year. As stated by the Administration to the Office of Management and Compliance Audits (OMCA) during multiple interviews and during School Board Committee and regular meetings, the Administration believed that not having a state-approved LMS could jeopardize the District's funding. Therefore, during July 2020, the District took action to acquire and implement the K12 product. K12 is an LMS that offers not only communication tools like those being used by students and staff over the Spring term, but it also offers its own curriculum. This was to be established as a one-year stopgap measure at the price of $15.3 million. The November 2019 RFP 19-26-CM for the acquisition of an LMS system was separate and distinct from the acquisition of the K12 LMS platform in July 2020.

The District is exempt from the competitive procurement process for purchases of educational services and copyrighted materials pursuant to School Board Policy 6320 and Florida Statute Section 1010.04(4)(a). Although the School Board Attorney's Office advised that the corresponding adoption of curriculum should be presented to the School Board at a public meeting in accordance with School Board Policy 2510, and Florida Statute 1006.28(2), the Florida Department of Education opined that said process did not apply to the temporary use of instructional materials based upon Emergency Order EO-06. Ultimately, the Administration proceeded with the K12 acquisition and implementation of the related curriculum without presenting it to the School Board prior to implementation/adoption[1].

The first week of school, beginning on August 31, 2020, proved to be largely problematic, wherein the School Board and Administration received concerns of many teachers and parents/guardians regarding the K12 platform's shortcomings and access to and use of it. Teachers expressed their dissatisfaction and disagreement with the curriculum content, and many could not properly use the new platform mostly due to insufficient training. Students and their parents/guardians reported difficulty connecting to classes and understanding how to use the system. There also appeared to be several denial-of-service attacks that week on the District's cyber infrastructure that hindered the opening of schools.

At the September 9, 2020, School Board meeting, the School Board presented Item H-13, which directed the Superintendent to terminate "any and all contractual considerations of K12 and the LMS for the remainder of the 2020-2021 school year." In a memorandum from the Superintendent to the School Board, it was stated that the District had not finalized negotiations on a contract for service with K12 which the Superintendent had not signed, therefore, K12 was never purchased. After the termination, the District returned to using Microsoft Teams and the existing resources teachers were familiar with when schools had previously closed in the Springtime period.

At that same School Board meeting of September 9, 2020, Good Cause School Board Agenda item H-14 Revised, *Audit/Review of the District's Readiness and Capabilities in the Acquisition of a Large-Scale Instructional Technology Platform*, was proffered by School Board member Ms. Mari Tere Rojas and co-sponsored by the Honorable Board Chair Mrs. Perla Tabares Hantman, Board Vice-Chair Dr. Steve Gallon III, Board Member Dr. Dorothy Bendross-Mindingall and former Board Member Ms. Susie Castillo, and approved unanimously during the meeting. In addition to directing the Chief Auditor to perform the said audit, this agenda item also directed the Chief Auditor to engage an external firm to perform network security testing services of the District biennially, and it directed Financial Services to provide the biennial funding for the network testing services not to exceed $50,000, starting with the 2020-2021 fiscal year. The OMCA modified the

[1] At the September 9, 2020, School Board meeting, an amendment to School Board Policy 2510, *Instructional Materials and Resources*, was proffered by Board Vice-Chair Dr. Steve Gallon III, and approved by the Board. The item amends said board policy to require the use of instructional materials to fully comply with applicable state laws, and any waiver of Board Policy 2510 based on a declared emergency to be approved in advance by the Board in a public meeting.

FY 2020-21 Annual Audit Plan in September 2020, to comply with this School Board Directive.

The next day, on September 10, 2020, a News Alert notice from the Administration communicated that the Superintendent had established a task force that enlisted assistance from some of the local business community's most respected members with expertise in technology and cybersecurity.

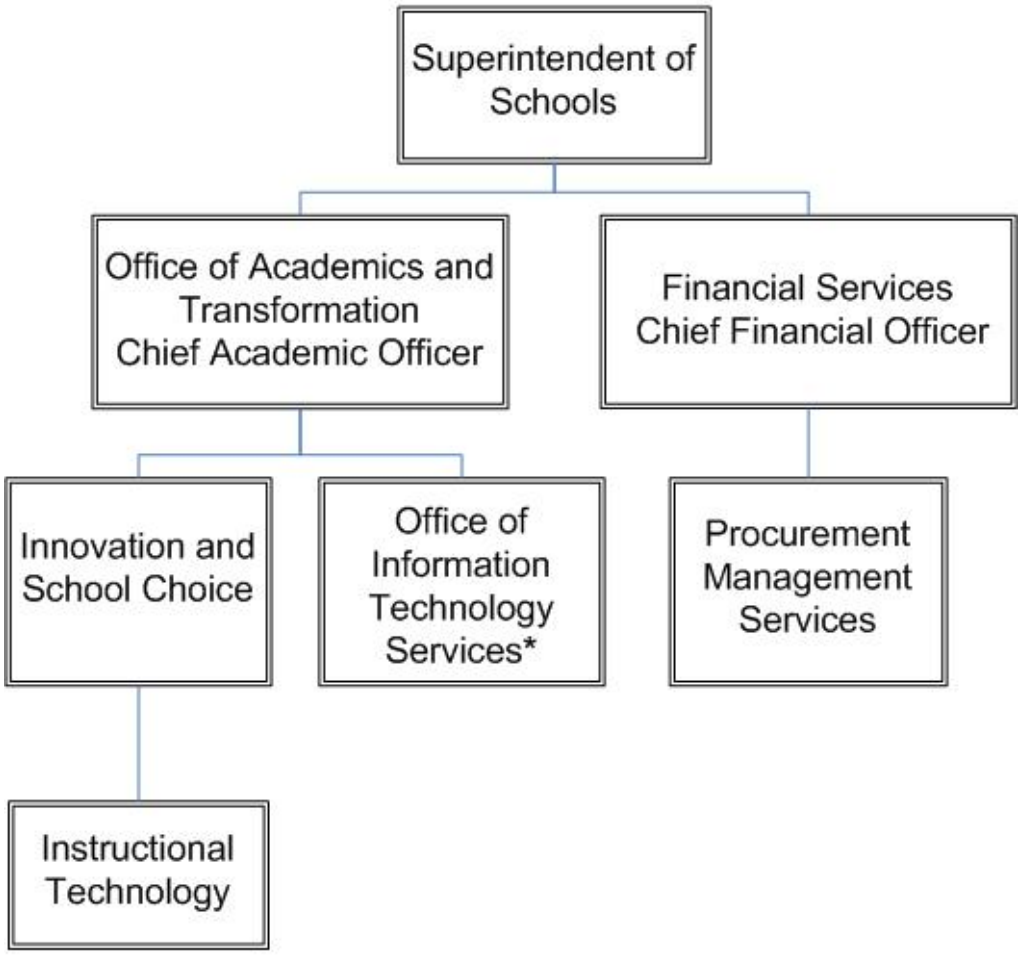
What follows is a chronology of events related to the K12 implementation and termination of the K12 LMS project.

Chronology

Nov 20, 2019	•RFP 19-26-CM (School Information System/Learning Management System) was issued. This was more than 3 months prior to the COVID-19 pandemic and distinct from the acquisition of the K12 LMS platform in July 2020. Responses received by January 14, 2020.
March 9	•Governor's Executive Order EO-20-52 State of Emergency due to COVID-19.
March 13	•Superintendent invoked School Board Policy 8420 and declared an emergency closure of all schools effective Monday, March 16.
May	•Search begins for a Virtual Instruction Program (VIP) that would be ready for the reopening of schools in August 2020 as opposed to RFP-19-26-CM, issued prior to the pandemic that would not be ready in time for the opening of schools.
July 1	•Board approves MDCPS' tentative reopening plan required by the state via Agenda Item SP-1.
July 6	•DOE-2020-EO-06 was filed by the Commissioner of Education. Essentially, Districts that complied with the requirements in the order would receive State funding in Fall 2020 based on previously projected rather than actual enrollment.
July 13	•Meeting to launch K12 platform held between the District and K12.
Aug 20 - 28	•Training for teachers, students and parents ("Week of Welcome" August 24 - 28).
August 31	•First day of school (100% remote learning) and go-live with K12. •Network issues and Distributed Denial of Service attacks occurred.
Sept 11	•Services with K12 terminated and the District returns to using the tools used in the immediate response to the pandemic during the Spring of 2020.
Oct 5-9	•Schoolhouse/virtual model option made available to students. •Students allowed to attend school in person.
Feb 10, 2021	•RFP 19-26-CM, issued on November 20, 2019, awarded to PowerSchool LLC (Schoology) as agenda item E-146 of February 10, 2021 School Board meeting.

Partial Organizational Chart

July 1, 2019 – January 25, 2021



*Note: Certain changes in the District's organizational chart were approved at the January 25, 2021 Board meeting, including the Office of Information Technology Services, which now reports directly to the Superintendent with a dotted line reporting to the Chief Academic Officer. Also, these changes resulted in the appointment of a new Chief Academic Officer.

OBJECTIVES, SCOPE AND METHODOLOGY

The objective of the audit was to determine the District's readiness and capabilities in the acquisition and implementation of a large-scale instructional technology platform. We identified standards and expected protocols involved with the acquisition and implementation of large-scale instructional platforms and compared the District's acquisition and implementation of the K12 platform to said standards and protocols, taking into consideration the challenges during the COVID-19 pandemic and the unexpected but necessary shift to a virtual learning environment. We also reviewed Executive Orders/Directives from the Governor and/or the Florida Department of Education and resulting impacts on the District's process of providing virtual education during the pandemic.

We performed the following procedures to satisfy our objective:

- Obtained an understanding of the District's decisions and actions leading to the acquisition and implementation of the K12 platform, as it relates to the scope of our audit.

- Reviewed and identified standards, directives, policies, rules and best practices that may be applicable to the audited area, including:
    - Various National Institute of Standards and Technology (NIST) publications
    - M-DCPS' Network Security Standards (NSS)
    - International Organization for Standardization (ISO)
    - State of Florida:
        - Executive Orders and directives
        - Reopening plans for various Florida school districts
        - Administrative Rules
    - School Board Policies:
        - 6320 - Purchasing
        - 2510 - Instructional Materials and Resources
    - Florida Statute 1010.04 – Purchasing

- Interviewed District staff and reviewed documentation from various offices responsible for, or with insight to, the acquisition and implementation of large-scale instructional platforms, the K12 platform and related contractual products/services including:
    - Office of Academics and Transformation
    - Information Technology Services
    - School Choice and Parental Options
    - School Board Attorney's Office
    - Assessment, Research and Data Analysis
    - Procurement Management Services

- Interviewed and surveyed applicable senior staff and reviewed documentation of the seven other largest Florida school districts and other of the nation's largest school systems, including:
    - Broward County Public Schools
    - Duval County Public Schools
    - Hillsborough County Public Schools
    - Orange County Public Schools
    - The School District of Palm Beach County
    - Pinellas County Schools
    - Polk County Public Schools
    - Clark County School District
    - Fairfax County Public Schools
    - Los Angeles Unified School District
    - Seattle Public Schools

- Reviewed applicable web pages and documentation of the nation's 20 largest school systems.

- Consulted with the Director of Business Services of the Council of the Great City Schools as to technology committee structures of member districts.

- Researched governance structures emerging in the private sector as they relate to technology and cybersecurity.

- Reviewed relevant contracts including:
    - Unexecuted K12 contract
    - The District's Internet Service Provider contract

- Reviewed prior audits or work performed by other entities in the audited area.

- Attended certain selection committee meetings for RFP 19-26-CM (School Information System/Learning Management System), wherein sandboxing activities took place and/or were reported on.

- Reviewed videos and/or minutes of applicable M-DCPS School Board and committee meetings.

We conducted this audit in accordance with *Generally Accepted Government Auditing Standards* (GAGAS) issued by the Comptroller General of the United States of America Government Accountability Office (GAO). Those standards require that we plan and perform the audit to obtain sufficient and appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

FINDINGS AND RECOMMENDATIONS

1. District Administration And K12 Did Not Adhere To Standards And Practices Needed For Successful Implementation Of The K12 Virtual Platform

We found that the District's Administration was not adequately prepared to use the K12 instructional technology platform for its remote learning necessitated by the Pandemic at the opening of the 2020-21 school year. Numerous instructional and information technology standards and industry practices describe a process and timeframe for implementing such instructional technology. In starting the implementation of K12 during July 2020, with a "go-live" deadline of August 31, 2020, we found that this six-week period was decidedly insufficient to meaningfully adhere to standards and practices that would be required in a successful implementation.

Both the Superintendent of Schools and the Chief Executive Officer of K12 expressed regret about the failed implementation and related problematic opening of schools, and although they reiterated their genuine intentions, they acknowledged that the implementation's timeframe was questionable. At the October 14, 2020, School Board Committee meeting, the Superintendent stated, in part, "I don't know how to speak about this matter other than through full honesty and transparency. This was a failed execution of what I thought was a very strong vision and plan. Timing was not on our side." Similarly, in a letter received on September 8, 2020, to the School Board, the K12 CEO wrote, in part, "Although we all knew the 6-week timeframe was a challenge, we owed it to the students, their families, and their teachers to deliver. And while in any complex, highly scaled solution there will be ongoing issues to solve, we still regret we have not been able to get to where the Miami-Dade administration wants us to be."

Based on our research and interviews of instructional and information technology staff of the eight largest school districts in Florida, including Miami-Dade County Public Schools (M-DCPS), we estimate that the timeframe required to properly acquire and implement a large-scale instructional technology platform in an entity the size and complexity of M-DCPS would typically range from a minimum of six months to more than two years.

Examples of where the Administration and K12 fell short in the implementation of the K12 platform can be found in National Institute of Standards and Technology (NIST) standard SA-16 (Developer-Provided Training), as well as various standards outlined in the International Organization for Standardization (ISO).

NIST standard SA-16 essentially calls for sufficient training to be provided to users of the software, and states "types of training include web-based and computer-based training, classroom-style training, and hands-on training (including micro-training)." However, documentation and other evidence gathered demonstrates that training to teachers, support staff and school administrators was mostly limited to a five-day period commencing August 20, only 11 days in advance of the start of the school year. The appropriateness and usefulness of the training, which included how to use K12, but also significant pedagogical instruction, was also called into question by many teachers.

The International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC) and the Institute of Electrical and Electronics Engineers (IEEE) series of software testing standards 29119, also known as ISO/IEC/IEEE 29119, details the types of testing that should be conducted prior to the organization going live with a new technology platform. For example, subsection 4.5 (Capacity) tests a system's ability to deal with increasing loads relative to the number of users, transactions or data storage. Subsection 4.10 (Endurance) evaluates whether a system can sustain a required load continuously for a specified period of time, and Subsection 4.20 (Load) typically assesses behavior during varying low, normal and peak usage.

However, the evidence provided demonstrates that these testing standards were not meaningfully adhered to. We interviewed applicable District administrators and reviewed documentation that showed very limited testing late in the process, and concerns over the results of those tests. Additionally, interviews conducted with District staff indicated that the K12 platform did not have the capacity or scalability to manage the volume of students and teachers that would need to access the platform simultaneously.

As described in the BACKGROUND section of this report, the District used Microsoft Teams and Zoom among other tools to enable remote learning on a mass level at the outset of the pandemic and had already released in November 2019 a Request For Proposal (RFP) to procure a learning management system (LMS) that would provide for remote learning on a mass scale. However, that new LMS was not going to be implemented and ready for use until substantially after the start of the 2020-2021 school year. As stated by various senior District administrators during public meetings and in interviews during our audit, District management believed it was necessary to implement a state-approved LMS such as K12 for remote instruction by the start of school year 2020-2021, in order to receive full state funding pursuant to DOE-2020-EO-06.

It should be noted that although several of the other large Florida school districts surveyed already had some level of an LMS in place prior to the pandemic, none of those districts arrived at the conclusion that their state funding would be in jeopardy absent the acquisition and implementation of one of the State approved LMS' such as *K12, Florida Virtual School* or *Connections Education of Florida.*

Current Learning Management System Request For Proposals

In contrast to the lack of preparedness or readiness for the use of the K12 platform at the beginning of the 2020-2021 school year, the planning and acquisition of the learning management system through RFP 19-026-CM (School Information System/Learning Management System) issued in November 2019 (pre-COVID-19 pandemic) and referenced in the BACKGROUND section of this report appears to be adhering to applicable standards and best practices thus far. It was issued "to establish a contract for qualified firms and/or individuals for the development and implementation of a school information/learning management system in Miami-Dade County Public Schools," according to the Description of the RFP.

For the acquisition and implementation of an LMS through RFP 19-026-CM, selection and implementation committees/teams were established, which included instructional and information technology subject matter experts with substantial experience and credentials. The LMS Selection Committee met 24 times between February 2020 and December 2020[2] and employed sandboxing[3] methodologies to test the proposer vendors' software for compatibility during the lengthy procurement process.

At its February 10, 2021 meeting, the School Board approved the highest ranked District LMS vendor in item E-146, which was PowerSchool Group LLC (Schoology).

Recommendation

1.1 While we are encouraged by the Administration's thorough adherence to necessary standards and practices through the planning and procurement phases of the LMS currently being implemented, the Administration must continue to adhere to said standards and practices in the remaining implementation of the LMS and other like-kind implementations going forward. Adequate testing and training are especially important and should continue to involve the full participation of all applicable departments and technical staff.

Management Response:

As acknowledged by OMCA, the District had initiated the procurement process for an LMS well before the onset of the COVID-19 pandemic. In early 2019, staff began drafting the specifications for a learning management system, a gradebook, and a student information system inclusive of tools scheduler, transcripts, registration, lunch and more. RFP-19-026-CM – Student Information System/Learning Management System was advertised in November 2019 to procure a system to be rolled out for the 2021-2022 school year. The evaluation, planning and implementation process timelines were aligned with industry standards and best practices.

Furthermore, the District has a long history of successful technology implementations, both in terms of administrative and instructional applications with examples that include SAP, Performance Matters, iReady, Focus, Ellevation and others. The administration will continue its practice of developing sound project plans and timelines for procuring, configuring, and testing new applications as well as providing comprehensive, timely and ongoing user training.

Even during the unprecedented demands imposed by the COVID-19 pandemic and the state's 11th hour requirements for delivery of equivalent online and in-school learning opportunities, the District still followed appropriate steps to acquire and implement the

[2] The LMS Selection Committee did not meet between February 20, 2020 and June 8, 2020.

[3] Sandboxing provides entities with virtual environments that they can use to build, test, and deploy software. CloudShare, 'What is a Sandbox Environment?', CloudShare, p. 1, https://www.cloudshare.com/virtual-it-labs-glossary/what-is-a-sandbox-environment (Accessed 22 January 2021).

K12 platform: looking at state approved providers, following established Board policies for the procurement of software products, and testing systems in a sandbox environment prior to implementation. Every effort was made to follow customary standards and practices, albeit in truncated fashion. Throughout the shortened configuration and implementation period, the District received continuous assurances that the platform would adequately address the needs of a large district. Unfortunately, the vendor's system did not perform as promised, rendering fruitless the considerable efforts of District staff over the course of the six-week implementation time frame.

2. Consideration Should Be Given To The Establishment Of A Board-Level Committee To Advise And Inform In All Matters Regarding Technology And Cybersecurity

During multiple School Board meetings relative to the 2020-2021 start of the school year, members expressed significant concern over the relatively sudden attempted purchase and implementation of the K12 instructional technology platform and other issues associated with its use during the 2020-2021 opening of schools. Central to those concerns was the process of procuring the platform and the corresponding adopting of a curriculum, in which multiple Board members expressed that this was done by the Administration without being sufficiently presented to the School Board in a public meeting for its consideration and direction.

As described in the BACKGROUND section of this report, the District is exempt from the competitive procurement process for purchases of educational services and copyrighted materials pursuant to School Board Policy 6320 and Florida Statute F.S. Section 1010.04(4)(a). Although the School Board Attorney's Office advised that the corresponding adoption of curriculum should be presented to the School Board at a public meeting in accordance with School Board Policy 2510, and Florida Statute 1006.28(2), the Florida Department of Education opined that said process did not apply to the temporary use of instructional materials based upon Emergency Order EO-06. Ultimately, the Administration proceeded with the K12 acquisition and related curriculum without presenting it to the School Board prior to implementation/adoption.

Subsequent to the opening of schools, at the September 9, 2020 School Board meeting, the Superintendent of Schools acknowledged that in retrospect, he would have presented K12 to the School Board for its consideration prior to its acquisition, when he stated: "Hindsight being 20-20, had I had the opportunity to do it again, I certainly would have brought the contract to the Board for approval even though the statutes and Board policy protects what we did."

Global Expansion in Technology and Cybersecurity Activities

Separately, the use of instructional and information technology in all aspects of K-12 education and operations, including distance learning (especially in light of the COVID-19 pandemic), data analytics as well as web-based and social media applications, have greatly expanded to this point in time. Cyber security issues have dramatically risen as an ongoing risk in both the private and public sectors, globally and locally, and the information technology and cyber security environment is in a constant state of flux and evolution. All the aforementioned has increased the Administration's required expertise and need for resources to address the myriad of additional risks that come with the rise in instructional and information technology, but it has especially added to the School Board's governance and oversight responsibilities and corresponding need to be kept abreast and well-informed.

As part of this audit, OMCA's research indicates a trend in the emergence of board advisory committees that have been implemented in both private and public sector entities to support corporate governance and leverage technology and cyber security expertise.

According to a recent publication by the consulting firm *Accenture*, growth in the establishment of technology committees and/or cybersecurity committees for the boards of publicly traded companies belonging to the Russell 3000 index[4] ranged from 20% to 70% during a one-year period in 2019-20[5]. The publication cites several large companies, including Walmart, whose board created a Technology and eCommerce Committee, and FedEx, which has established an Information Technology Oversight Committee.

A publication dated March 15, 2020, entitled "Cybersecurity: An Evolving Governance Challenge" by the Harvard Law School Forum on Corporate Governance points out that boards of large companies have developed a wide variety of structures for overseeing technology and cybersecurity, and cites one corporate director whose audit committee, after a major breach, decided to devote the first hour of every committee meeting to cyber matters.

In the realm of public education, a review of the nation's largest school districts reveals a significant number of school systems also have or are planning on implementing a technology advisory committee. Three of the nation's 20 largest school systems, including Broward County Public Schools, School District of Palm Beach County, and Fairfax County Public Schools evidenced the establishment of a committee to advise the board and senior management on information technology issues. Clark County School District (Las Vegas), the nation's 5th largest school district, is currently in the process of considering the establishment of a technology advisory committee or group. The School District of Palm Beach County, the nation's 10th largest district, provides a good example of a school board level authorized committee. It established its Technology Advisory Committee in 2008, where its School Board Policy 1.096 states that "The School Board recognizes that technology is a major component of its operations and in the instruction of its students." The Committee serves in an advisory capacity to the Board and is composed of seven members appointed by the Board who have "substantial technology leadership or technical experience within a large enterprise."

[4] The Russell 3000 Index is a capitalization-weighted stock market index that seeks to be a benchmark of the entire US stock market.

[5] R. Kress, '2021 Vision: Best boardroom practices in digital and cybersecurity governance'. *Accenture*, 2020, p. 2, https://www.accenture.com/us-en/blogs/security/best-boardroom-practices-digital-cybersecurity-governance, (accessed 20 January 2021).

Recommendation

2.1 Consideration should be given to the establishment of a School Board technology advisory committee for purposes of:

a. Supporting the School Board in the discharge of its governance duties involving all matters of technology and cybersecurity, by advising, informing and lending expertise in a global technology environment which is regularly in a state of flux and evolution.

b. Leveraging the extensive talent, expertise and generous public service culture of the local community to the benefit of the school system in an increasingly complex technology environment.

The committee should be created through School Board level authorization and be comprised of individuals from the community with extensive and high-level technology experience.

Management Response:

Management considers that the work of Information Technology Services does not lend itself to governance by a standing advisory committee. In fact, the involvement of members of the public in matters of IT governance could be contrary to the safeguarding of IT systems and protocols, especially where cybersecurity is concerned. Nevertheless, management acknowledges that an advisory committee of experts, with CIO and CTO experience, preferably in government, K12 or higher education, could be convened on a periodic basis for the purpose of garnering feedback on planned upgrades or changes to the District's IT systems and infrastructure as well as providing guidance on whether the District's technical infrastructure is aligned with industry best practices and emerging technologies.

However, the role of such a committee should be clearly delineated such that its function is advisory and will not involve recommendations on the selection, administration or evaluation of instructional programs, specific software solutions or product vendors.

3. The District Should Consider Seeking Legal Remedies From Its Internet Service Provider Pursuant To The Contract

The District contracted with an Internet Service Provider (ISP) to provide internet connectivity from July 1, 2018 through June 30, 2023. Threat mitigation services against Denial of Service (DoS) attacks and other threats were also included in the contract.

A Denial-of-Service (DoS) attack is a malicious attempt to disrupt the normal traffic of a targeted server, service, or network by overwhelming the target or its surrounding infrastructure with a flood of internet traffic. A Distributed-Denial-of-Service attack (DDoS) compounds the attack by utilizing other compromised computers to simultaneously join the attack, generating greater traffic volume.

The District's virtual reopening of schools (week of August 31 through September 4, 2020) appears to have been severely impacted by a DDoS attack, preventing both students and teachers from reaching online educational resources, including the K12 platform.

The District's ISP has acknowledged a connectivity issue affecting the reopening of schools. Pursuant to the contractual agreement between the District and the ISP, unmitigated DDoS attacks and/or lack of connectivity may provide for legal recourse from the ISP.

In addition, District management has indicated to us that a claim has been filed with its cybersecurity liability carrier as a result of the DDoS attacks.

Recommendation:

3.1 The District should further explore this issue to ascertain whether the ISP failed to provide services and consider seeking any legal recourse or remedy that is legally feasible pursuant to the contract between the parties.

Management Response:

Comcast was selected as the District's Internet Service Provider (ISP) via the competitive bidding process and began providing services in 2018. As part of the agreement with Comcast, the District contracted for "Automatic Mitigation," meaning that the ISP (Comcast) would proactively detect and mitigate DDoS activity with no intervention required from the District. DDoS services began in June 2018, and the District had not experienced any outages attributed to DDoS attacks from the beginning of the engagement until August 31, 2020.

On the morning of August 31, the District experienced a widespread system outage. As staff scrambled to diagnose the root cause of the problem, Comcast was contacted during the troubleshooting process via telephone, and support representatives indicated that the District did not appear to be experiencing any circuit issues. When asked directly whether

the District might be experiencing a DDoS attack, ITS staff was told in no uncertain terms that it was not.

With that information in hand and knowing that the District had contracted for Automatic DDoS mitigation services and had not experienced a DDoS-related outage in approximately two years of transitioning to Comcast, staff continued to focus their troubleshooting efforts on hardware and software. Throughout that day, the system continued to fail and ITS staff reached out to Comcast two additional times to verify that the failure was not a result of circuit issues or DDoS attacks. Staff continued working with other vendors to troubleshoot the problem and even applied vendor recommended patches to our Cisco firewall.

During this time, knowing that a true root cause of the network problems had not yet been determined, staff developed alternative methods to allow teachers and students to access Teams, Zoom, and other required applications in an effort to allow teaching and learning to occur. Staff then continued working with other District vendors to troubleshoot the network problems.

When the attacks had somewhat subsided and connectivity became relatively stable, staff found emails that indicated that the District was being attacked; this information was contrary to what Comcast support had indicated. Upon finding this information, District staff reached out to Comcast support throughout the night, ultimately contacting Comcast executives at 2:00 a.m. Comcast assembled a robust team the following morning to assist with providing a solution to the ongoing District issues. It wasn't until the morning of September 1, that Comcast determined that the District was, in fact, the victim of DDoS attacks and that the District was not configured by Comcast for Automatic Mitigation, as contracted. Additionally, the notifications being provided to the District regarding attacks were being communicated only via email (which would be unavailable during a system outage) rather than via additional contact methods originally specified in the "Threat Management Services Customer Configuration Form" submitted by the District to Comcast.

Throughout the following week, the District continued to experience outages because of targeted DDoS attacks as District staff worked with Comcast engineers to develop a solution. This ultimately led to the "always on" mitigation solution that is currently in place and has successfully mitigated the nearly daily attacks that the District continues to experience.

As a result of the network connectivity failures experienced at the start of the 2020-2021 school year which were caused by malicious DDoS attacks, the administration sought and received, at no additional cost to the District, the highest available DDoS mitigation services from the Comcast. This mitigation solution substantially exceeds any requirements under the terms of the contract, is not commercially available to the ISP's other customers, and includes dedicated resources to assist with mitigation efforts upstream. Further details may not be publicly disclosed for security reasons.

4. Technical Recommendations To Further Enhance The District's Network Connectivity And Cybersecurity

We discussed with ITS management various issues regarding network availability and recommended for consideration certain actions to further protect against potential cybersecurity attacks.

Our recommendations centered around enhancements to network connectivity options and the internal monitoring process.

Management responded and enumerated actions and assessments under consideration to address this matter.

The issues discussed with management and the details of the finding and recommendations have been omitted from this report for security purposes pursuant to Section 281.301, Florida Statutes, Security systems; records and meetings exempt from public access or disclosure.

GLOSSARY OF TECHNICAL TERMS/ACRONYMS

The following definitions are provided for abbreviations and acronyms used in this report:

LMS	Learning Management System – A robust system allowing teachers to share and store numerous instructional materials, including assignments, worksheets, calendars, and assessments; track student progress and grade work; send messages and notifications to students; facilitate discussions with students using blogs and/or discussion boards; conduct online class meetings; and much more. Blackboard, SharePoint, and Moodle are all commonly used LMS'
ITS	Information Technology Services - Central District IT facility
NIST	National Institute of Standards and Technology – A national organization charged with developing, among other standards, Information Technology security standards and guidelines for governmental information systems
NSS	Network Security Standards – Internal organization IT guidelines for M-DCPS
DDOS	Distributed Denial of Service - An attack in which multiple compromised computer systems attack a target, such as a server, website or other network resource, in order to cause a denial of service for users of the targeted resource
ISO	International Organization for Standardization – Organization developing and publishing international standards

APPENDIX

MANAGEMENT'S RESPONSE MEMORANDUM

M E M O R A N D U M **February 26, 2021**

TO: Ms. Maria T. Gonzalez, Chief Auditor
Office of Management and Compliance Audits

FROM: Jaime G. Torrens, Chief of Staff
Office of the Superintendent

SUBJECT: RESPONSE TO DRAFT REPORT - AUDIT OF THE DISTRICT'S READINESS AND CAPABILITIES IN THE ACQUISITION AND IMPLEMENTATION OF A LARGE-SCALE INSTRUCTIONAL TECHNOLOGY PLATFORM

We appreciate the professional manner in which the Office of Management and Compliance Audits (OMCA) conducted the above referenced audit. As has been amply discussed to date, in March 2020, Miami-Dade County Public Schools faced an unprecedented challenge when schools were abruptly closed due to the COVID-19 pandemic. Virtually overnight, the District pivoted to online instruction which remained in place through the remainder of the 2019-2020 school year. At that time, there was great uncertainty regarding the timing of a physical return to the schoolhouse for the 2020-2021 school year.

The work required to transition approximately 300,000 students and over 20,000 teachers immediately from traditional school environments to full-time virtual environments following the closing of schools was urgent and complex. The District mobilized resources to address technology needs, instructional delivery, internet access, and professional development to ensure continued learning during the remainder of the 2019-2020 school year; mobile devices were redistributed across the District to get them to the areas of greatest student need; additional hotspots with free internet service were acquired and deployed to students without home Internet service; a help desk was established to assist parents, students, and teachers who were experiencing difficulties with the transition to online learning; and new applications were made available for teacher and student use.

The continued "face-to-face" communication between teachers and students was vitally important to instructional continuity, so Microsoft Teams was rostered and configured in a matter of days and District staff developed and provided both live and recorded training on the use of the application. This allowed teachers to communicate with students via video streaming instead of only through written communication tools available through the current online platforms being used. In response to teachers' preference for Zoom, due to its simplicity of use and support of multiple video streams, the District entered into a contractual agreement with Zoom. Through Zoom, teachers were able to view an entire class on one screen as opposed to the limited number of video streams supported by Teams. Once again, District staff worked with personnel from Zoom to roster and configure the application in a matter of days. Zoom was setup and ready to go and teachers were able to access both live and recorded training sessions developed and delivered by District staff. Professional development offerings, centered around effective strategies for distance learning, were developed and delivered, and biweekly pacing guides for distance learning were created.

Anticipating that the typical summer learning loss would be compounded by the seismic shift to a complete online learning environment, the District developed a summer program to address potential learning loss and target unengaged students. The summer program was implemented immediately following the end of the 2019-2020 school year.

As the District was ensuring that learning continued unabated during the final months of the 2019-2020 school year, staff began planning simultaneously for the potential continued closure of schools during the 2020-2021 school year. Staff searched for more effective solutions and tools for the upcoming school year while the District awaited guidance from the state as to what would be required, allowed, and eligible for funding. The state did not offer school districts guidance regarding protocols or procedures for continued online learning that would be eligible for funding until July 2020. With the opening of the 2020-2021 school year looming, the District made the decision, in July, to proceed with K12. K12 was not an unknown system to the District or to the state and a major consideration for its selection was the fact that K12 was, and is currently, an approved State of Florida Virtual Instructional Program (VIP) provider that would allow for consistency in the delivery of instructional content across schools and classrooms. While the state did not require online participation to be limited to VIP programs/providers, state requirements dictated that the same instructional program needed to be used for students physically in school or learning online. Staff determined the materials and resources available within the District did not meet the intent of the state's equivalency requirements between online and in-school instruction and would likely result in significant variations in the educational program delivered to students through these two different instructional models.

Policies and procedures are established for normal and sometimes emergency situations. These were extreme circumstances requiring the District to provide the best available remote instruction. Despite the K12 problems, the District had several backup systems in place that allowed instruction to continue. At the time, the urgent need to implement a drastic transition from traditional face-to-face instruction to an online environment for over 300,000 of the District's students and teachers, prompted District staff to implement a shortened vetting, selection, and implementation period that would not be executed during non-emergency times. However, it should be noted that customary District standards and practices were followed and Board policies in place at the time were adhered to.

While a review of an organization's internal control processes or procedures is appropriate to ensure that they are operating effectively and efficiently, it should be recognized that there are circumstances such as the current COVID-19 pandemic, in which organizations must be innovative to provide continuity of services and to support to their stakeholders. The closure of all schools was a call to action precipitated by a nationwide state of emergency, and the District did not have the luxury of time for in-depth exploration and evaluation of an array of unknown platforms. The fact that the K12 platform, in the end, failed to live up to expectations, despite continued assurances by the vendor, does not minimize the dedication of staff who worked tirelessly during this time of national emergency.

Below are Management's Responses to the Findings and Recommendations:

Finding 1
District Administration and K12 did not adhere to standards and practices needed for successful implementation of the K12 virtual platform

Recommendation 1.1
While we are encouraged by the administration's thorough adherence to necessary standards and practices through the planning and procurement phases of the LMS currently being implemented, the administration must adhere to said standards and practices in the remaining implementation of the LMS and other like-kind implementations going forward. Adequate testing and training are especially important and should continue to involve the full participation of all applicable departments and technical staff.

Management's Response
As acknowledged by OMCA, the District had initiated the procurement process for an LMS well before the onset of the COVID-19 pandemic. In early 2019, staff began drafting the specifications for a learning management system, a gradebook, and a student information system inclusive of tools scheduler, transcripts, registration, lunch and more. RFP-19-026-CM – Student Information System/Learning Management System was advertised in November 2019 to procure a system to be rolled out for the 2021-2022 school year. The evaluation, planning and implementation process timelines were aligned with industry standards and best practices.

Furthermore, the District has a long history of successful technology implementations, both in terms of administrative and instructional applications with examples that include SAP, Performance Matters, iReady, Focus, Ellevation and others. The administration will continue its practice of developing sound project plans and timelines for procuring, configuring, and testing new applications as well as providing comprehensive, timely and ongoing user training.

Even during the unprecedented demands imposed by the COVID-19 pandemic and the state's 11th hour requirements for delivery of equivalent online and in-school learning opportunities, the District still followed appropriate steps to acquire and implement the K12 platform: looking at state approved providers, following established Board policies for the procurement of software products, and testing systems in a sandbox environment prior to implementation. Every effort was made to follow customary standards and practices, albeit in truncated fashion. Throughout the shortened configuration and implementation period, the District received continuous assurances that the platform would adequately address the needs of a large district. Unfortunately, the vendor's system did not perform as promised, rendering fruitless the considerable efforts of District staff over the course of the six-week implementation time frame.

Finding 2
Consideration should be given to the establishment of a Board-level committee to advise and inform in all matters regarding technology and cybersecurity

Recommendation 2.1

Consideration should be given to the establishment of a School Board technology advisory committee for purposes of:

- ***a. Supporting the School Board in the discharge of its governance duties involving all matters of technology and cybersecurity, by advising, informing and lending expertise in a global technology environment which is regularly in a state of flux and evolution.***
- ***b. Leveraging the extensive talent, expertise and generous public service culture of the local community to the benefit of the school system in an increasingly complex technology environment.***

The committee should be created through School Board level authorization and be comprised of individuals from the community with extensive and high-level technology experience.

Management's Response

Management considers that the work of Information Technology Services does not lend itself to governance by a standing advisory committee. In fact, the involvement of members of the public in matters of IT governance could be contrary to the safeguarding of IT systems and protocols, especially where cybersecurity is concerned. Nevertheless, management acknowledges that an advisory committee of experts, with CIO and CTO experience, preferably in government, K12 or higher education, could be convened on a periodic basis for the purpose of garnering feedback on planned upgrades or changes to the District's IT systems and infrastructure as well as providing guidance on whether the District's technical infrastructure is aligned with industry best practices and emerging technologies.

However, the role of such a committee should be clearly delineated such that its function is advisory and will not involve recommendations on the selection, administration or evaluation of instructional programs, specific software solutions or product vendors.

Finding 3

The District should seek legal remedies from its Internet Service Provider pursuant to the contract

Recommendation 3.1

The District should further explore this issue to ascertain whether the ISP failed to provide services and consider seeking any legal recourse or remedy that is legally feasible pursuant to the contract between parties.

Management's Response

Comcast was selected as the District's Internet Service Provider (ISP) via the competitive bidding process and began providing services in 2018. As part of the agreement with Comcast, the District contracted for "Automatic Mitigation," meaning that the ISP (Comcast) would proactively detect and mitigate DDoS activity with no intervention required from the District. DDoS services began in June 2018, and the District had not experienced any outages attributed to DDoS attacks from the beginning of the engagement until August 31, 2020.

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With that information in hand and knowing that the District had contracted for Automatic DDoS mitigation services and had not experienced a DDoS-related outage in approximately two years of transitioning to Comcast, staff continued to focus their troubleshooting efforts on hardware and software. Throughout that day, the system continued to fail and ITS staff reached out to Comcast two additional times to verify that the failure was not a result of circuit issues or DDoS attacks. Staff continued working with other vendors to troubleshoot the problem and even applied vendor recommended patches to our Cisco firewall.

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Please let us know if you have questions or would like to further discuss our response.

JGT:sm
M023

cc: Mr. Alberto M. Carvalho
Dr. Sylvia J. Diaz
Ms. Tabitha G. Fazzino
Mr. Eugene P. Baker

Anti-Discrimination Policy

The School Board of Miami-Dade County, Florida adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964 as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Education Amendments of 1972 - prohibits discrimination on the basis of gender. M-DCPS does not discriminate on the basis of sex in any education program or activity that it operates as required by Title IX. M-DCPS also does not discriminate on the basis of sex in admissions or employment.

Age Discrimination Act of 1975 - prohibits discrimination based on age in programs or activities.

Age Discrimination in Employment Act of 1967 (ADEA) as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40 years old.

The Equal Pay Act of 1963 as amended - prohibits gender discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to eligible employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

Title II of the Genetic Information Nondiscrimination Act of 2008 (GINA) - prohibits discrimination against employees or applicants because of genetic information.

Boy Scouts of America Equal Access Act of 2002 – No public school shall deny equal access to, or a fair opportunity for groups to meet on school premises or in school facilities before or after school hours, or discriminate against any group officially affiliated with Boy Scouts of America or any other youth or community group listed in Title 36 (as a patriotic society).

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.

In Addition:
School Board Policies 1362, 3362, 4362, and 5517 - Prohibit harassment and/or discrimination against students, employees, or applicants on the basis of race, color, ethnic or national origin, religion, marital status, disability, genetic information, age, political beliefs, sexual orientation, sex/gender, gender identification, social and family background, linguistic preference, pregnancy, citizenship status, and any other legally prohibited basis. Retaliation for engaging in a protected activity is also prohibited.

For additional information about Title IX or any other discrimination/harassment concerns, contact the U.S. Department of Education Asst. Secretary for Civil Rights or:

Office of Civil Rights Compliance (CRC)
Executive Director/Title IX Coordinator
155 N.E. 15th Street, Suite P104E
Miami, Florida 33132
Phone: (305) 995-1580 TDD: (305) 995-2400
Email: crc@dadeschools.net Website: https://hrdadeschools.net/civilrights

Revised 07/2020

Miami-Dade County Public Schools

Internal Audit Report

Audit of the District's Readiness and Capabilities in the Acquisition and Implementation of a Large-Scale Instructional Technology Platform

March 2021

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