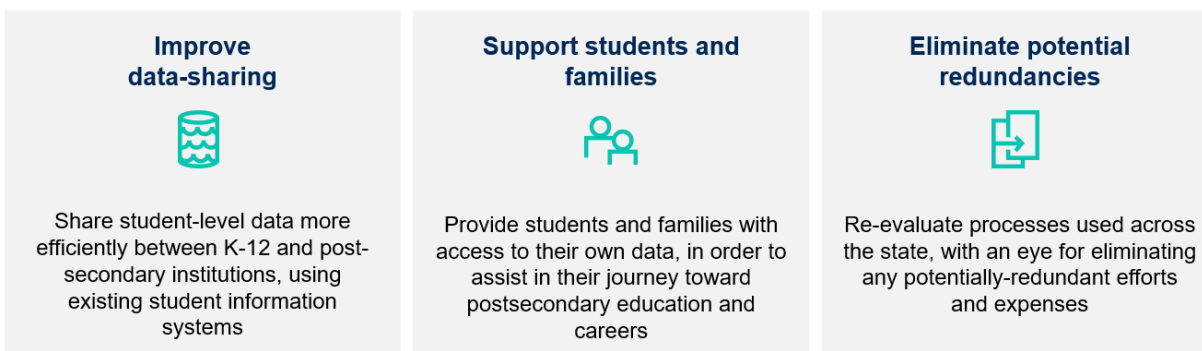# Executive Summary

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1.0 Executive Summary

Overview

myFutureNC engaged Gartner Consulting to study interoperable and interconnected student data systems for North Carolina, pursuant to Session Law 2022-74 §7.11. This study supports North Carolina's education leaders in determining how interoperable and interconnected student data systems can facilitate a more seamless exchange of data between and among institutions.[1]

Figure 1.   Stated Goals for Interconnectivity and Interoperability

Improve data-sharing	**Support students and families**	**Eliminate potential redundancies**
Share student-level data more efficiently between K-12 and post-secondary institutions, using existing student information systems	Provide students and families with access to their own data, in order to assist in their journey toward postsecondary education and careers	Re-evaluate processes used across the state, with an eye for eliminating any potentially-redundant efforts and expenses

Current State — Understanding the Need

Gartner heard that students and the frontline workers who support them are challenged by the lack of interoperability among student data systems.[2] They are currently expected to use data from various distinct and non-integrated systems to get a complete picture of a student's progress.

Gartner discovered recurring challenges that can be improved with interoperability:[3]

- Lack of visibility into the many pathways and options available to students and the staff who support them as they plan for postsecondary education[4]
- Inefficiencies when students apply to and enroll in postsecondary institutions (e.g., excessive time spent entering data, reconciling records, and interpreting transcripts)
- Challenges when students transfer between postsecondary institutions (e.g., loss of credits or time, lack of clear articulation agreements)[5]

North Carolina can address these challenges by providing access to more current and streamlined data and by standardizing how data is shared and used across institutions.

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[1] Per the National Institute of Standards and Technology (NIST) SP800-47, "interconnection" is defined as "the direct connection between two or more systems in different authorization boundaries for the purpose of exchanging information and/or allowing access to information, information services, and resources." In contrast, "interoperating systems" interact with a source system of interest for the purpose of jointly performing a function. Working definitions of these terms, as they are used throughout this study, are provided by Gartner in Section 2.2.

[2] Throughout this study, Gartner uses the term "frontline workers" to refer to those staff members at education institutions who work directly with students as part of their day-to-day responsibilities. This includes roles like guidance counselors, advisors, admissions staff members, and other administrators who work with students throughout the K-16 pipeline.

[3] These are illustrative only. More detailed information is provided throughout the report; please see Section 4.0 in particular.

[4] According to statistics provided by myFutureNC, approximately 32% of all high school graduates enrolled in at least one dual enrollment college-level course during their high school years, and this percentage is growing. These students need better insights into how these courses might be beneficial to them in their postsecondary educations.

[5] In the fall of 2021, approximately 17,000 students transferred to the UNC System from North Carolina Community Colleges, private, out-of-state, and other institutions. This data point was provided by myFutureNC.

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Findings

Gartner found that North Carolina already has many of the technology components that would be necessary to support interoperability and interconnectedness across its K–16 data ecosystem. North Carolina can begin by building upon this existing technology immediately, as part of a larger journey to develop interoperable and interconnected student data systems.

The findings in this report indicate that the state should move forward with developing and implementing better interoperability, given the potential for this work to contribute positively toward the state's educational attainment goal: to have two million North Carolinians ages 25–44 hold an industry-valued credential or postsecondary degree by 2030.[6] The state will also need to invest in maintaining the critical source systems and solutions that will ultimately become interconnected to enable interoperability.[7] If the source systems for interconnectivity are not adequately funded and maintained, the quality and availability of student data will be compromised, negatively affecting the state's ability to pursue interoperability.

Developing and sustaining interoperability and interconnectedness across K–16 student data systems is a *transformational journey*—one that requires dedicated, sustained leadership and sponsorship, proven technology solutions, and changes to education data standards and processes. While this study concludes that interoperability and interconnectedness will contribute to the state's educational attainment objectives, such a system will not, by itself, achieve these objectives. The state must couple any new technologies with the required governance structures and policies, changes to business processes, and investments in skilled human capital that will be necessary to sustain interoperability. The organizational and process challenges will be significant and require as much effort as the development of any new technology.

Key Stakeholder Requests

With support from key stakeholders, Gartner identified ten priority stakeholder requests, or "use cases," that support the interoperability and interconnectedness of student data.[8]

Table 1.   Key Use Cases

#	Description	High-Level Requirement
1	**Unified K-16 Digital Transcript**	As a student or guardian, I would like to be able to view a K–16 universal digital transcript that shows my courses, credits, exams, and credentials from all the schools I attended within North Carolina.[9] This would build upon my existing K–12 digital transcript and may include a competency-based view.[10] I must be able to manage access to this record and control how my data is shared with institutions or employers in the future.

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6 In 2019, North Carolina established a statewide postsecondary attainment goal in House Bill 664. The goal is "to increase access to learning and improve the education of more North Carolinians so that, by 2030, two million North Carolinians between the ages of 25 and 44 will have completed a high-quality credential or postsecondary degree."

7 E.g., K–12 Student Information Systems (SIS) and higher education Enterprise Resource Planning (ERP) solutions. These terms are defined in the glossary.

8 This study uses the concept of use cases to identify specific ways in which interoperability can advance the state's educational attainment goals. These items are numbered for reference only and are not in a ranked priority. There are many more potential use cases that the state may wish to consider; these are the ten priorities identified by stakeholders during this study. The state should anticipate that, as systems become more interoperable, there will be additional use cases that support educational attainment.

9 While this is referred to as a K-16 transcript throughout this study, stakeholders noted that the actual grade bands and data elements are still to be determined. For example, it may ultimately be more helpful to produce a "secondary through college" view. In addition, as with all future use cases, this must comply with critical data privacy and security requirements.

10 Stakeholders noted there is also a desire to provide tools for a mastery-based or competency-based record. This use case should support a modernized education framework that would allow the state to create scalable, flexible, and portable learning records for students, along with competency-based records where appropriate.

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#	Description	High-Level Requirement
2	**Portable, Holistic Student Portfolio**	As a student, I would like a student portfolio that, in addition to courses and grades, would include information related to my extracurriculars, athletics, awards, and work-based learning. I would like to be able to control access to my data and share it with institutions or employers when appropriate.[11]
3	**Manage Privacy Settings**	As a student or guardian, I would like a tool to opt-in or opt-out of sharing data and manage who can access my records.
4	**Data Sharing Bidirectionally Across Sectors**	As a K–12 administrator, I would like to receive data on my students' subsequent enrollment and attainment in postsecondary institutions after they have left K–12, to help me understand how to improve my own schools' work.[12]
5	**Real-time Data for Dual Enrollment**	As a school administrator or advisor, I would like to view the attendance and grades of my students enrolled in another institution's programs in near real-time, so that I can provide better and more immediate support.[13]
6	**Student Degree Roadmap**	As a student, advisor, or college administrator, I would like to be able to view degree requirements through a single, searchable portal that incorporates information from the many articulation agreements, baccalaureate degree plans, and other policies that determine potential student degree pathways.
7	**Inter-institutional Higher Ed Course Map**	As a college administrator, I would like to leverage a consistent crosswalk that maps courses across higher education institutions and supports transcript evaluation.
8	**Automated Transcript Matching**	As a college administrator, I want a more efficient process to be implemented so that I can match applications to existing student materials.[14]
9	**Connected Postsecondary Systems**	As a college administrator, I would like a centralized student data system to be implemented within the NCCCS so that I can better track data for students moving from one postsecondary institution to another. This should support more consistent registration, enrollment, and grading.[15]
10	**Postsecondary Interest Survey**	As a college administrator, I would like a survey with questions of my choice implemented and deployed to high school students, so that I can later receive better data about their preferences and intentions, providing support for postsecondary enrollment where appropriate.

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[11] This use case was often compared to a myChart® for students that would allow graduates to export artifacts for use after graduation.
[12] This refers to data and tools beyond what is provided by a Longitudinal Data System (LDS).
[13] Stakeholders noted that there are important policy and legal distinctions that apply to students enrolled in high school vs. those enrolled in college courses. As an example, only, attendance for high school tends to be "face to face," whereas in virtual Career and College Promise (CCP) courses, attendance is demonstrated by participation and completion of assignments.
[14] This could include leveraging the North Carolina Department of Public Instruction's (NCDPI) existing Student Unique Statewide Identifier (UID) web service, the North Carlina Department of Information Technology's (NCDIT) entity resolution process, etc.
[15] As part of this item, stakeholders strongly support recurring funding to maintain and improve data systems and data use across the pipeline.

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Potential Outcomes

Interoperable and interconnected student data systems have the potential to assist students, families, and administrators as they work toward the shared goal of attaining postsecondary degrees and credentials. The table below provides a list of the interim outcomes that can be achieved if the above requests are met.

Table 2.   Potential Outcomes Aligned to the Above Use Cases

#	Outcome	Explanation
1	Complete View of Student Records	Students may have a single place to view important data from K–16, including potentially a more holistic view of not just transcript data but information on extracurriculars, awards, and work-based learning. Students would have control over, and access to, their data after they leave high school and could authorize others to view this information when appropriate. For example, students could use this view to demonstrate knowledge and skills to potential employers. This supports the legislative goals of improved data sharing and better support for students and families.
2	Data Shared for Improvement	School-based staff may have better bidirectional data flows, provided in near real-time, complementing other historical and aggregated data available in Longitudinal Data Systems and other tools. Any dashboards or reports would utilize predictive and prescriptive analytics and practical, student-level data (where permissible).[16] This supports the goal of improved data sharing.
3	Better Understanding of Postsecondary Options	Students and frontline staff who support them may have tools that describe a personalized roadmap or journey through postsecondary education, highlighting key steps and dates.[17] This could potentially mean that students have a single place to review the various requirements and course loads associated with specific degree programs so that they can make informed choices.[18] This supports the goal of improved data sharing and better support for students and families.
4	Support for Postsecondary Transfer Students	Students and frontline staff who support them may have a better understanding of the articulation processes and agreements that affect which credits are used and accepted at postsecondary institutions. Students might also potentially experience an easier process when enrolling in /transferring to higher education programs. There may even be a measurable impact in "lost credits" and associated costs, with the appropriate agreements and processes. This supports the goals of improved data sharing, better support for students and families, and eliminating potential redundancies.
5	More Efficient Application Process	The state may experience a more seamless process that is less manual and labor-intensive for staff. In theory, improvements to the process and experience of applying to postsecondary education might mean that more students enroll, and administrative resources can be redeployed to drive better student outcomes. This supports the goal of eliminating potential redundancies.

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[16] For example, a guidance counselor may be able to pull a list of former students who are actively enrolled in a community college as of the current date, in order to support them as appropriate.

[17] Counselors, advisors, tutors, and community partners play a critical role in supporting students directly and guiding them through decisions at key points in their educational journey (e.g., what types of programs to apply to, what funding is available, how to transfer credits, etc.). Stakeholders reported a need for more support and tools to better leverage data in support of their constituents.

[18] A large amount of information is already available, but it is sometimes hard to navigate or not contextualized.

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High-Level Cost Estimates

Gartner estimates the cost to develop the technology for student data interoperability to be approximately $16-$20 million over approximately three years, from inception to completion. This includes $5-$8 million for initial technology costs, plus the costs associated with human capital, process redesign, training, and organizational change management; all of these are critical components to successfully enable interoperability and interconnectivity. Gartner estimates that it will cost the state approximately $1-$3 million for annual technology maintenance fees.[19]

The state can also choose to begin with a Proof of Concept (POC) over approximately 12-15 months, as outlined in the recommendations below. Gartner estimates the cost to implement a POC would be approximately $6-7 million. If the POC is implemented first, the total cost to implement the full solution would be reduced by this amount, for a total remaining cost of $10-13 million.

Actionable Recommendations

Gartner recommends that the state execute the following steps in the next 6-12 months:

1. Designate an Executive Sponsor

Building interoperability is a major undertaking that must be sponsored at the highest echelons within government. Gartner recommends that the state select an Executive Sponsor who has the appropriate statewide authority to implement interoperability and interconnectedness.[20] The Executive Sponsor must be dually empowered and accountable for achieving the key requests and outcomes. This level of authority will be required to galvanize support and effectively drive K–12, community college, and university sector stakeholders toward a unified vision. The Executive Sponsor should collaborate with education leaders from across the state to ensure their input and recommendations are accounted for as the program evolves.

2. Develop an Operating Model

Gartner defines an "operating model" as "the blueprint for how value is created and delivered to target customer." The Executive Sponsor should designate a team of subject matter experts from key sector institutions who can develop an operating model for student data interoperability. This operating model must specify how organizations, processes, technology, and policy will all function to support interoperability. This includes defining roles and responsibilities, procedures, data standards, technical capabilities, and governance.[21]

The operating model will require extensive collaboration across sectors. As such, the Executive Sponsor may wish to designate an independent, non-profit or government entity that is separate and apart from any individual sector, to guide this operating model. [22]

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[19] High-level price details and potential vendor insights are provided in Section 8.4.
[20] This individual is also called the "Senior Responsible Officer" in Gartner research. As an example, this could include Governor's Education Cabinet or Board of Education.
[21] Later sections of this report describe proposed governance model(s) as well as existing structures that may be able to be leveraged in support of interoperability.
[22] Some existing organizations for the state to explore as options might include MCNC, NCDIT, and the College Foundation of North Carolina, provided they have the right teams with the technology expertise needed to guide interoperability.

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3. Complete a Proof-of-Concept

This study highlights specific use cases and a composable architecture to address them.[23] Before committing to a full solution (and after completing steps 1 and 2), Gartner recommends that the state consider a Proof-of-Concept (POC). The POC should include three specific use cases (i.e., Unified K-16 Digital Transcript, Real-time Data for Dual Enrollment, and Student Degree Roadmap). This POC can be used to validate that the operating model and supporting technology will work together to produce the intended outcomes.

The state should consider investing a total of $6-$7 million over the course of 12-15 months to conduct the POC. To efficiently run the POC, the Executive Sponsor will need to establish an ongoing program-level governance and discrete project-level teams with representation from key organizations. This then includes:

- Creating and releasing a Request for Proposals (RFP) that includes the vision, business case, and detailed functional/technical requirements[24]
- Select vendor(s) best capable of implementing the POC based on a review of proposals
- Develop a minimum viable product (MVP) with the functionality required to implement selected use cases; concurrently, perform the necessary business analysis/process design
- Evaluate if the outcomes of the POC merit additional investment from the state

Executing the POC will require dedicated resources from the North Carolina Department of Public Instruction (NCDPI), the North Carolina Community College System (NCCCS), and the University of North Carolina (UNC) system. Resources must have subject matter expertise in existing source systems and technologies, processes, and data. Gartner estimates that 12-14 resources should be dedicated to supporting the POC, consisting of:

- Two to three people from each of the education sectors
- A POC project manager
- Four to five resources dedicated to developing the RFP and MVP

The cost of resources to support the POC are factored into the $6-$7 million cost estimate.

4. Develop legislation to mandate interoperability and commit funding

Because any successful program requires support beyond the initial technology implementation, and beyond individual peoples' tenures, Gartner recommends that the state codify and enact legislation that embeds interoperability within the education ecosystem and requires its implementation. As part of this process, the state should commit to long-term funding for maintaining and sustaining this program, provided the goals of the POC have been appropriately met.

In addition to funding for this interoperability program, it is critical that the state continue to invest in high-quality student data source systems and the necessary analytical and technological capacity to appropriately use the data collected, in support of student educational attainment.

These steps will set the state on the path toward greater interoperability and interconnectedness and further support students as they seek to earn high quality degrees and credentials and build meaningful careers.

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[23] A composable architecture organizes technologies into modular application building blocks that deliver well-defined capabilities in support of specified business outcomes.
[24] This may require multiple RFPs, e.g., one for technology and one for systems integration/implementation.

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