



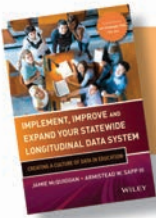
Foreword from
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IMPLEMENT, IMPROVE AND EXPAND YOUR STATEWIDE LONGITUDINAL DATA SYSTEM

CREATING A CULTURE OF DATA IN EDUCATION

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WILEY



From *Implement, Improve and Expand Your Statewide Longitudinal Data System*. Full book available for purchase [here](#).

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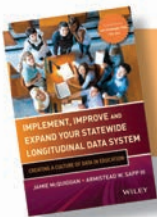
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CHAPTER 1

How to Establish a Successful SLDS

Larry and Helen work in the project office for the governor. Larry is a data analyst and Helen is a technologist, and, as a team of two, they're responsible for fulfilling information requests from various parties across the state. They receive a request from the state legislature. The state's elementary schools have been the beneficiaries of a generous donation from a private foundation to fund a new program designed to improve their Instructional Improvement Systems (IIS), and the two-year funding period is coming to a close. The state legislature wants to know if the program has worked and if its continuation should be funded. They want to know if the IIS program shows measurable gains among students who participated.

In the same state, at Ashley Elementary, John is a new student in Mrs. Fraser's third-grade class. He is reading below grade level, and Mrs. Fraser wants to help him. She is curious as to what John's previous schools have tried to remediate his needs. She needs this information quickly, so time isn't lost in addressing John's pressing need. Before he's compelled to repeat third grade or gets pushed into alternative education, Mrs. Fraser is anxious to pick up where previous teachers have left off to improve John's reading.

The governor wants to begin a task force to reduce the number of high school dropouts in the state. She asks the state's Department of Education to supply the following information to provide the backbone for an early warning system

that alerts educators when kids show certain characteristics. What are the characteristics of high school dropouts? Are there early predictors schools could find in elementary or middle school to better identify at-risk individuals? Do these predictors change in different geographic areas or among different demographic populations?

All of these examples are largely changed by the availability of longitudinal data, those data that provide the same measure over time. Without a comprehensive state system, the requestors of data will collect the data, collate them and assemble them in a way that makes sense and is usable. And the process can take several weeks, if it's even possible to collect all of the information. This system, Sneaker Net, has prevailed over the past decade. It is inefficient and has low levels of accuracy and security. If the state had an SLDS (statewide longitudinal data system), answering these requests would be much simpler, even instantaneous. Larry and Helen transition to maintaining the data, queries and systems, with much less legwork in obtaining the data from each agency. The validity of each data set is higher, as there is less room for human error.

This chapter will provide a foundation for the rest of the book: defining an SLDS, enumerating the benefits and selling points of these systems to convince those who aren't quite sure if it's worth the effort, and detailing how to establish new systems or improve existing ones to make them more efficient. We'll refer to the previous examples throughout the book to illustrate features and benefits as they pertain to various stakeholders and users of the system.

WHAT IS A STATEWIDE LONGITUDINAL DATA SYSTEM?

Siloed data is a pervasive issue among educational data. Many educational systems are housed within different agencies, tracking student data and not communicating. Housing data in siloed and disparate systems poses many problems for states in using data to solve issues (some of which are enumerated at the beginning of this chapter).

Uniting these systems that house student data is a prime way to make these data useful. *Statewide longitudinal data systems* (SLDSs)

track student data from preschool through college and workforce across the state. The federal government is encouraging states to develop and implement SLDSs to track and analyze their data. Initiatives like the America COMPETES Act, the No Child Left Behind Act, the American Recovery and Reinvestment Act, the Race to the Top program and various grant programs provide direct incentive to states that are at the leading edge in this enterprise. The Data Quality Campaign, a national advocate for longitudinal data usage and availability, found that currently, every state in the country is at some point in the process of developing an SLDS, some in the very early stages and some near completion.¹ Each state has longitudinal data. States are at varying points in maximizing the potential that SLDSs have to offer, and many are not yet using the data in substantially new and meaningful ways. States seem to be on board with the idea of an SLDS in theory, and the next key step is to empower states, educators and legislators to use and analyze the data to aid in providing education to students. It's time to put the data to work.

The defining characteristics of a statewide longitudinal data system are important to note, as the concepts that follow will depend upon a common understanding of the purported outcome.

- An SLDS tracks and maintains student- and staff-level data across the whole state (not simply district-wide or county-wide).
- An SLDS links these data across entities and over time, providing a robust and complete academic history for each student, as well as aggregated data about subgroups of students.
- An SLDS makes these data available to researchers and other educational agencies for analysis and reporting.²
- An SLDS provides current data to stakeholders in a secure manner.

Simply having data or a database with multiple contributing sources does not mean that an agency has a longitudinal data system. The key characteristic, as contrasted to the prevailing data storing and reporting methods still used in some states, is the ability to see student-level data over time and to use these data in the aggregate to spot trends and improve the education system.

Any type of SLDS will involve the assigning of a *unique identifier* (UID) to each student, as the student's Social Security number is not an acceptable way to identify a student. This UID is the key data value by which records are merged and integrated on all SLDSs, essentially enabling the connection between P–12 data and other state agencies. Adoption of a UID system by all parties, or a bridge to allow for matching on some other data field, is the first step toward a unified data system. Having a UID that follows the student as he moves to a different school, graduates or drops out, and enters the workforce enables the educational system to have easy access to rich data it has never had before.

One way to visualize the contrast between traditional educational databases and an SLDS is to think in terms of photography. Previous data-tracking methods consisted of snapshots of the child during standardized tests and report card grades, with gaps in between. An SLDS, then, is a video recording of each child from the day he sets foot in the public education system until he graduates college and enters the workforce. With much more footage (data) for each student, educators could note subtle changes that wouldn't have otherwise been obvious.³

WHAT AN SLDS CAN DO THAT SNEAKER NET CANNOT

An SLDS is a useful and important tool in performing existing reporting tasks more efficiently as well as using data to identify trends and make policy changes. In the examples from this chapter, an SLDS would give each party the ability to quickly and accurately get the answers they're seeking.

Establishing an SLDS is no small feat. It requires consensus among groups who are often unaccustomed to working together and sharing data, as well as changes in format and processes to ensure the data are interoperable and secure. And, perhaps most important, a successful SLDS implementation will require a culture shift in how the state's educational system as a whole views data as integral to its continued value and use. There are many substantial benefits to states that establish an SLDS that far outweigh the potential difficulties and obstacles to the effort. This list of benefits is designed to give a picture of what can be gained from a robust and comprehensive SLDS project.

Asking Questions and Getting Timely Answers

Simply put, the SLDS allows for streamlined question asking and answering. Storing vast amounts of longitudinal data allows the ability to ask questions across time, not just over the 1–2 years that most transactional systems allow. This is tremendously valuable in getting a full picture of the child’s education, spotting issues and opportunities. It can be an ongoing information source, not only when information is officially requested (as in our examples). An SLDS provides another valuable asset that a simple database cannot: timely answers. In addition to including larger amounts of data, teachers and administrators are able to get near-real-time answers to questions. In past models, data queried are several months—if not years—old, yielding results that don’t give administrators the opportunity to act. An SLDS allows for quick results drawn from updated information. The primary benefit to having updated information is the ability to act in a timely fashion. Further, quality and updated data availability will encourage the culture shift to asking deep and probing questions for the betterment of the education system.

Additionally, the ability to receive quick and accurate answers enables smarter reform. Being able to know if a reform initiative is working in a timely manner can influence its continued funding, as in the case of the state legislature asking about the effectiveness of the elementary reading program in our example. Even more important, research can become the backbone for new initiatives, driving policy rather than simply supporting it. Longitudinal data are essential to gauging the need for change: what sort of change to make to address the problem and evaluation of whether certain reforms are working. As it stands now and in old Sneaker Net systems, most decisions are being made on anecdotal hunches, a far cry from the data-driven decisions a comprehensive SLDS enables. Giving policy makers the ability to ask questions and receive an immediate answer with up-to-date data is one of the most promising, game-changing features of an SLDS.

Ultimately, linking disparate data sources also leads to the ability to learn new things about the data, which simply isn’t feasible with siloed data. As needs evolve and the complexity of research questions

grows, an SLDS can accommodate this. You can ask questions you didn't know you wanted to ask, and as long as the data are collected and stored, you can get the answer. SLDSs open new doors, allowing new connections to be explored.

Data-Driven Decisions That Can Impact Student Outcomes in Real Time

SLDSs enable proactive, preventative measures to be taken to correct the course of students on the wrong track. In the example of the governor's task force to lower the high school dropout rate at the beginning of the chapter, longitudinal data are an integral part of implementing the early warning system and doing the research to create it. Past models relied more on reactive action occurring after the fact. For instance, a student has dropped out of high school, so his record is evaluated and administrators might try to figure out where he got off the path to success. With an SLDS, it is easy to track dropout factors, and receiving alerts in a timely fashion affords administrators the opportunity for early intervention and the possibility to *prevent* a dropout from occurring. Research suggests that "failing grades in reading or math, poor behavior, being over age for grade, having a low grade 9 grade-point average, failing grade 9 or having a record of frequent transfers" are all factors that could flag a student as someone who might be more likely to drop out.⁴ Students who show these signs could be provided early intervention and perhaps their course could be reversed if these risk factors were flagged in time for action to be taken. *Response to intervention* and *early warning systems* accomplish this, showing how the data supplied by an SLDS might change the way education is given to students to prevent negative outcomes. These systems are detailed in Chapter 11. Providing more information in a uniform format facilitates this new culture of research possibilities.⁵

Another important facet of facilitating data-driven decisions is providing data to teachers in the classroom. In an SLDS, comprehensive student-level data are stored on the student record and can be provided to teachers. When a child moves from one grade to the next, teachers can be provided with more timely information than ever before about the child's past grades, behaviors, test scores and risk

factors. Before the school year even begins, a teacher has a window into each child's specific needs. Rather than solving issues as they arise, teachers can proactively address student needs, giving extra attention to areas of weakness or concern or creating a more challenging plan for students with high aptitude. In our example, Mrs. Fraser would see on John's record which interventions were used to improve his reading skills, enabling more targeted methods. And, in turn, the interventions she tries with John will be included on his record for future reference.

More Accurate and Effective Reporting

The implementation of an SLDS provides state and local educational administrators a vehicle for timely and accurate reporting with a reduction of effort. The integration of data from multiple sources to ensure that the reports are accurate reduces the burden of governmental reporting.

State and local educational agencies have the burden of many mandated state and federal reports. Having an interoperable set of data in an updated and standardized format allows for more efficient, and where possible, automated querying of data. This substantially cuts the amount of time and resources needed for recurring and required reports. A unified system and data standard among all educational agencies in the state further reduces data entry redundancies, and therein, errors. Take the example of the high school dropout task force. Even getting a true number of high school dropouts across the state is problematic, as the system is fraught with differing definitions and classifications of what constitutes a *dropout*.⁶ Issues relating to classification of special cases (i.e., a student who leaves high school to enter college early is sometimes classified as a dropout) would be addressed at the outset of the establishment of an SLDS, providing states and local educational agencies (LEAs) with the opportunity to have an accurate picture of their dropout rate. Thus, for Larry and Helen to provide the numbers to the requesters, it would take far less time and be more accurate. In this way, an SLDS allows for more educational agency time and energy to be put toward analyzing data and helping students.

New Connections and Increased Collaboration

Fundamentally, an SLDS links systems that are not connected. While this is certainly a difficult process, it leads to less duplication of effort and more accuracy and security for the data. In any educational system, be it a local district or an entire state, there are multiple databases to be included in an SLDS, often with different data sets and different purposes for existence. One group might track student test scores, another student attendance records, and another student special needs. It is essential in the establishment of an SLDS that these systems “speak the same language” and map to the same data standard (most commonly, the *Common Education Data Standards [CEDS]*). Systems that are unable to meet the standard mandated by the Governance body for the SLDS cannot integrate to the system. Providing a database with multiple sourcing and interoperable data is essential in meeting the needs of users going forward into the culture of data-driven decision making. To answer any of the above example questions would involve dozens of individual requests to local agencies and queries to state databases. It would further involve deduplication and collation of the information to make it meaningful, all of which are time consuming and prone to human error. In short, without an SLDS, these sorts of insightful research questions are simply not feasible.

Having a *statewide* LDS can save time and money for LEAs that want this level of technology but can’t fund it in its entirety at the local level. Fostering collaboration on the state level will free up LEA time, give the LDS a higher level of investment and buy-in and prevent the LEA from having to go it alone. “With a statewide LDS project, states should think of districts as partners, rather than as customers. As such, the LDS should be conceptualized and developed not as something that districts simply need to comply with, but as a valuable tool that will benefit both the state and the district.”⁷

A Measure for Educational Effectiveness

A functioning SLDS system, ultimately, is a tool that provides accurate and important insights about a state’s overall effectiveness—its success in educating students, effectiveness of its teachers, and progress in

its schools, district, programs and initiatives. Data showing ineffective programs or schools can have impact on funding decisions. What is at stake when we're discussing the implementation of an SLDS is the future of education, fueled by data-driven decisions.

Further, the ability to tie student records to the teachers of record offers another opportunity for insight. The ability to spot excellent and effective teachers encourages wider adoption of their techniques, and rewarding their efforts should encourage a culture of excellence. On the other end of this spectrum, being able to identify ineffective teachers and provide remediation provides the opportunity for reinforcement of a culture of excellence. *Teacher-student* longitudinal data would encourage teacher preparation programs to monitor the success or weakness of teachers and adjust their programs to be more effective.

WHAT IT TAKES TO IMPLEMENT (OR IMPROVE) A SUCCESSFUL SLDS

States are at various points in their SLDS development and implementation. Even systems that have been functional for years are trying to make improvements to make their systems more efficient and modern. How do states get to the point where they can make data-driven decisions and improve educational outcomes? What are the things they can do as they design and implement systems to promote long-term success? There are a few key areas that should be focused on when strategic decisions are being made for design and improvement of SLDSs, as illustrated in Figure 1.1. States need to improve *processes*, *technology* and *leadership* surrounding their SLDSs and data management to get to the next level.

Processes

Setting up an SLDS typically takes several years of planning, executing and negotiations between stakeholders on how to get the data compatible and in a common place to be shared and accessed. Through these exercises, processes will be established to enable consistent and easy operation of the SLDS in common, predictable scenarios. While the method of establishing the SLDS can feel drawn out and tedious at

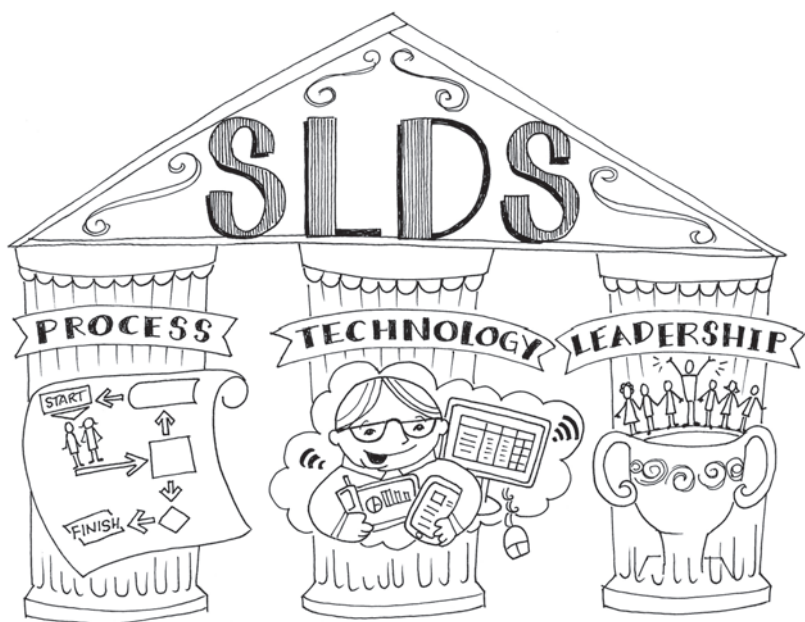


Figure 1.1 Implementing or Improving a Successful SLDS

times, if done thoroughly, it should establish guidelines for access, privacy and data-quality processes. Establishing a uniform way for these recurring actions to be handled is essential.

It is important to establish processes for data security and student privacy. This is a common concern among stakeholders, as they can vouch for their own security practices within their own system but are unsure of how others treat student data. And, sharing data often means more risk of disclosure. While this is always a possibility, a good SLDS with strong processes and policies will almost definitely be more secure than the siloed systems of today. Richard Culatta of the U.S. Department of Education notes that “there are times where using technology carefully can actually help us improve privacy and security.”⁸ To this point, a unified data system means that all agencies are on the same page, using an agreed-upon high standard of security for student data. It will outline and enable secure sharing, a vast improvement over siloed systems’ current processes. Culatta mentions one example of how a student record travels from one school to another

if the student moves. Typically, the record is printed out, mailed and reentered, leaving several opportunities for it to be lost, to be seen by unauthorized eyes or for errors to be made in entering the data. Having a way to share these records using the data system seamlessly safeguards all parties and makes for a more secure system.

To have a successful SLDS, there must be processes for sharing data with the larger database, and processes for authorized uses to access the data. These processes will all be enumerated in the planning stage and be changed with group consensus, but having an agreed-upon process is crucial to a functional SLDS. And finally, a process for data quality will be created and instituted, giving all the users faith in the validity of data used from other agencies. To be a successful SLDS, users must trust that the output is valid and can be relied upon. Data quality procedures will ensure the continuing compatibility of data and the consistency of data across sources.

Technology

Though an SLDS is not solely a technical project and should have representation from all areas of educational agencies involved in its implementation, the technical component of the project can't be ignored. There are definite system requirements that must be satisfied to make a functional and usable system that performs as the users' desire. The technology component includes hardware, software and system design. It is important to understand how much data the system will need to manage, how much will be added yearly and how the system will be used. All of these data points will inform the hardware, software and system design.

It is hard to overstate how important it is to have a system with good design. Users have become accustomed to highly usable and intuitive cloud-based web applications, such as iTunes and Gmail; data systems should strive to meet this level of simplicity and usability. If the system is usable, intuitive and gives the users information they need easily, it will be accessed and utilized more often. Design SLDSs with dashboards and end-user input. Don't simply design a system and use professional development time to train users. While training on a new system is, of course, necessary, it shouldn't be the only way that

a new user can figure out the system. Spend time in the development and design of the SLDS. Meet with end users to have them test and try the design. Using their input and feedback will ensure that the end result will be a functional and useful system that can be accessed and understood. Good design will enable high levels of use.

Make sure the software can accomplish all it needs to and that it is powerful enough to enable analytics, reporting and sharing in the high volumes that an SLDS should accommodate. The software should be powerful enough to grow as your need for analysis and information grows, facilitating data management and enabling reporting systems to function. Some software solutions can address all of these needs, while others would necessitate a more piecemeal solution, combining several systems. And, ensure the hardware can host the large data sets that will live on an SLDS. Millions of student records, and over time those numbers will only grow, should be accommodated on the SLDS.

Leadership

Ultimately, an SLDS can't be a successful initiative and investment if all levels of educational data agencies in the state are not on board in creating a culture of data. This means continually reinforcing the benefits to stakeholders and communicating regularly to share status, priorities and changes. Keeping the team engaged, informed and committed is essential to maintaining buy-in at all levels. Intelligent and enthusiastic leadership is a must-have for any SLDS project.

The *data governance committee*, assembled with representation from all stakeholder groups and educational agencies, will largely set the tone for the project and provide leadership on the project. As influencers within their agencies, they can share the news with their colleagues, and can help steer the project in positive directions. Setting up Governance is discussed in Chapter 3.

To further reinforce the importance of longitudinal data, administrators must be invested in data to drive decisions. When a change is proposed, data must be demanded to support the new proposal. Showing, rather than simply telling, that data-driven decisions are the new normal is a key way to prove the game has shifted in educational

data. Further, using data to support their evaluations of teachers in the school and encouraging use of data to make classroom decisions are key administrator responsibilities in shifting the culture of the school to a more data-centric one.

Involved, informed and passionate leadership is also vital to maintain the political will to keep the SLDS project moving and funded. Make no mistake—creating and maintaining an SLDS is an arduous task but one that is worth the investment. Make sure that in the early stages these leaders are chosen wisely.

To establish or improve your SLDS, it's important to consider each of the three areas for development and attention: processes, technology and leadership. Addressing these areas enables your system to grow over time and adapt to future changes in needs. How do you design a system that meets the needs of your state and the various interests at different levels within the education system, and within the budget available? This book will tackle these logistical issues, tell the stories of several unique SLDSs in different states and outline a roadmap for SLDS growth and data use.

PREVIEW

Though for many readers the situations described at the beginning of the chapter and the roadblocks they highlight are a reality, we write this book to provide a roadmap for successful implementation and expansion of an SLDS to help positively change the landscape of education in the United States. Providing schools, administrators and educational agencies on all levels with better data and the power to use the data for improvement is the ultimate vision for SLDSs.

We hope to provide background and guidance for new SLDSs, as well as a resource for existing SLDSs that are aiming to enhance certain aspects of their systems. Throughout the book, we discuss the concept of a culture of data, and how to instill it at all levels of the educational data pipeline.

In Chapter 2, we discuss the SLDS landscape, providing a background in student data management and common database architectures. An overview of the current state of SLDSs nationwide will be included, as well as common challenges SLDSs face.

Chapter 3 details the planning process, including best practices regarding data governance, standards and privacy. In addition, we will discuss CEDS and the importance of data interoperability standards.

Chapter 4 provides an in-depth discussion of data management practices and database architecture, a key decision for each state to make in designing its SLDS. We provide explanations on master data management and metadata management, as well as compare and contrast the two primary architectures for SLDSs: centralized data warehouse and federated data system.

Chapters 5–7 include three case studies, describing states that provide exemplary models in SLDS implementation and practice. Each case study provides details about what makes the state’s SLDS unique and the challenges it faces. Michigan’s, North Carolina’s and Florida’s SLDSs are featured.

Chapters 8 and 9 outline the importance of sharing data with educators and other individuals who are entitled to have access to student and educational data. Researchers, policy makers, parents, students and administrators are discussed as parties who should be included in the SLDS. Each has something to gain from the data in the SLDS, which can impact their roles significantly.

Chapter 10 makes the case for including out-of-school time and health-care data in the SLDS in order to give a fuller picture of the student. These nonacademic factors can impact a student’s success in school, and including them in the data set gives educators a chance to better understand and address these outside factors. Additionally, as more states get their SLDSs established and functional with educational data, the shift to focusing on expansion will mean more states will move to incorporate data from additional sources that give a fuller picture of the student.

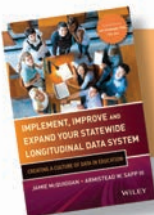
Chapter 11 describes how the culture of data built around longitudinal data used can solve many of the difficult problems plaguing our educational system. Leadership and the implementation of several key tools and applications that work within the SLDS enable more proactive data use. Using response to intervention programs becomes more intelligent with shared longitudinal data, and early warning systems provide useful alerts using the SLDS, enabling real-time intervention.

Finally, Chapter 12 revisits how the examples we offered at the beginning of this chapter are substantially changed with access to longitudinal data. We also discuss how to promote accountability, data access and institutional change using the SLDS.

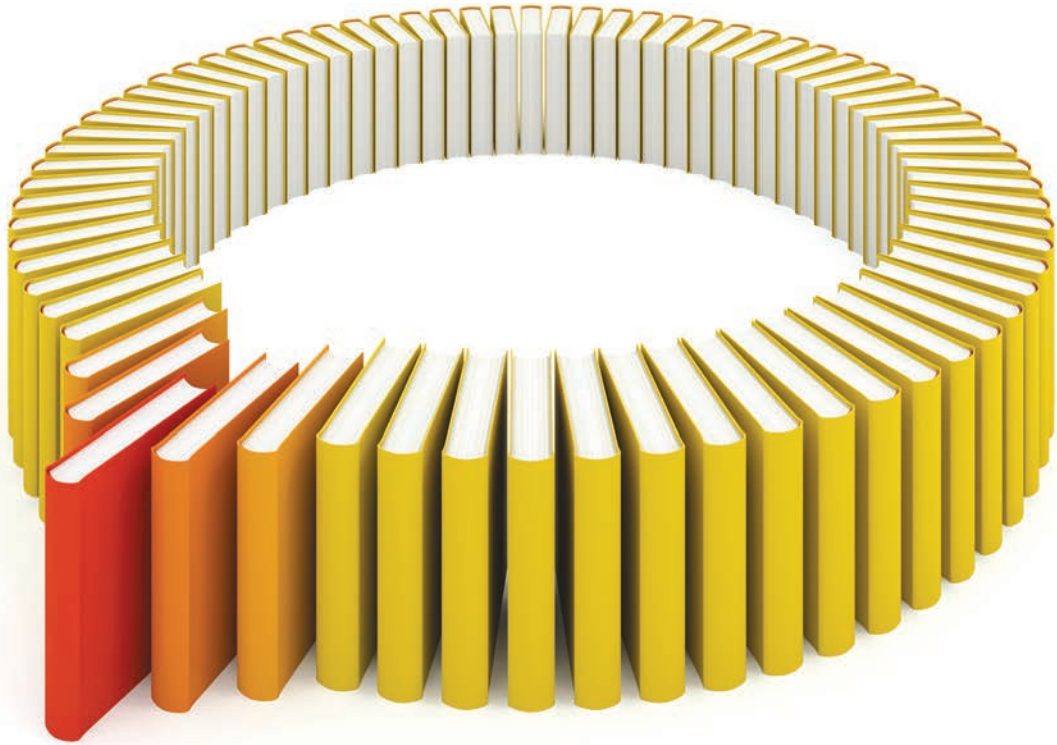
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