
Using NRS Data for Program Management and Improvement

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Chapter I. Information, Data and the National Reporting System

We live in a world in which information is everywhere. Every day, a multitude of sources – books, newspapers, the broadcast media, the Internet – exposes us to facts and figures on dozens of topics that demand our attention. For many of us, the challenge is to filter and evaluate from this information overload, the knowledge we need to run our lives or to make decisions and judgments important to us.

Ironically, adult educators often do not use one important source of information: the data they have available on their students, programs and instruction. Adult education teachers and program staff spend much time and resources collecting and reporting data to meet requirements of the National Reporting System (NRS) and their state accountability systems, but frequently do not see these data as a valuable source of information about their program. Yet, these data can help demonstrate a program’s accomplishments to the general public and funders, help manage the program and identify areas in need of improvement.

Program staff often sees data collection as paperwork that is done for someone else – the “feds,” the state, their bosses, bureaucrats – that has little value to them and what they do. Misperceptions abound about data and its use, including:

- **Data are “just numbers.”** They do not capture what is important about students or instruction.
- **“I’m not quantitative and can’t deal with math.”** Data require complex technical skills to understand and use.
- **“It’s not my job.”** Teachers and other staff often do not perceive collecting and interpreting data to be part of their job.
- **“You can prove anything with lies and statistics.”** Data are untrustworthy– they can be used to show anything.

In addition, program staff often lack direct access to data and may not be able to review the information they collect. Poor data collection procedures that may exist in programs also work against data use. Staff recognizes data of low quality are of little use, reinforcing perceptions that data are not valuable.

The purpose of this guide is to change these perceptions– specifically to change how you think about data collected for the NRS. Besides explaining basic concepts and issues about data, the guide also includes a framework and model for using NRS data for program management and improvement.

Why Care About Data?

No one becomes an adult educator for fame or fortune. Adult education is a helping profession and the major reason people become involved is to help others improve their lives. The goals of adult education, as stated in legislation such as the Workforce Investment Act (WIA) and other frameworks, clearly articulate these reasons: to help people improve their literacy skills, become lifelong learners, succeed in employment and become better parents and citizens. To achieve these goals, programs must meet the needs of learners by designing effective instruction and services. Only through information about who is attending your program, how long they attend, what they achieve and why – in other words, *data* – can you design a quality program that helps students. It is almost impossible to provide quality instruction without using data as a guide.

Unlike in business and many other professions, adult educators do not typically see data in this way or use data to make decisions. In fact, in many educational settings data have often been used punitively, to demonstrate why schools are failing or ineffective, for example. Most teachers can relate at least one negative experience they have had due to something in “the data.” But once they begin thinking about how they can improve practice, teachers and other adult educators usually begin to see how data can clarify, explain and help in program management and improvement efforts.

Data Clarify and Explain

We all have our own beliefs about what makes a good adult education program work – why students enroll in the program, why they stay, how they learn – and try to design our approach to match these beliefs. We also know that the same approach does not work for everyone. Reviewing data can be eye-opening for staff because while there is usually some evidence to support beliefs about which students are learning and attending, many differences also appear. Some types of students do better than others, some gains are more or less than what is expected, and students in some classes attend more than in other classes. These differences can be surprising, but they can also help clarify and explain patterns. They can identify successes, but also areas in need of improvement. Once staff begins to question why these differences occur, the need for data becomes obvious.

Data For Program Management and Improvement

Something is not working in your program and you have to fix it. Maybe you are not meeting your performance standards or enrollments are not where you want them to be. Retention is too low or perhaps teachers have noted that certain classes, materials or instructional approaches are not working. These are situations where data can most help you. By exploring the data, you can pinpoint the problem and make informed decisions about what to change and how to change it. Once you have made the change, data can help you again. You can monitor and evaluate the effect of the change by reviewing its impact, as reflected in the data.

Without data, you can only guess what is not working, how to correct it and whether your efforts at change were effective. While your guesses may be informed by your experience, this approach is not likely to be successful, especially in a large program. There are too many variables that can affect processes as complex as adult learning – student demographics, attendance, teacher characteristics, and instructional approaches – for you to make and evaluate informed decisions without data. Only data can provide the guidance you will need.

Data For Clarification and Improvement: An Example

An example from a large adult education program in California illustrates how data can clarify and guide program improvement efforts. This program serves a large and diverse adult ESL population through regular ESL classes and ESL citizenship classes. The staff had assumed that the same type of students enrolled in both the ESL citizenship and the regular ESL classes. Accordingly, recruitment for both types of classes had been the same and the same teachers taught both sets of classes. However, enrollment was lower than expected in the citizenship classes and students were not succeeding in them. There was low retention and many students were not taking the citizenship exam.

To understand and correct this problem, the program director decided to look at the data. She compared the native languages and ages of the students in both types of classes. Exhibit 1.1 shows the tables created through her program’s database.

Exhibit 1.1 Student Native Language and Age For ESL and ESL Citizenship Classes

A. Native Language

Native Language	ESL	ESL Citizenship
Spanish	57%	24%
Vietnamese	25%	35%
Chinese	10%	26%
Cambodian	1%	1%
All Others	7%	14%

B. Student Age

Student Age	ESL	ESL Citizenship
18-24	25%	1%
25-34	33%	14%
35-44	20%	19%
45-54	12%	26%
55-64	5%	23%
65 and Older	5%	17%

Program staff was quite surprised when they reviewed these tables because they discovered that their assumptions about the similarity of the student groups were wrong.

The data revealed substantial differences between the students that attend the two types of classes. The majority of students (57 percent) in the regular ESL classes spoke Spanish and were young – 58 percent were between 18 years and 34 years old. In the ESL citizenship classes, however, most students (61 percent) were Vietnamese or Chinese. Only 24 percent of these students spoke Spanish. There were even greater differences between the student groups on age. The students in the ESL citizenship classes were much older – 40 percent were 55 years old or older and only 15 percent were between 18 years and 34 years old.

The program director presented these findings to her teachers and they discussed possible reasons why young Spanish-speaking students attended ESL classes while older Asian students attended citizenship classes. They also discussed how these differences might affect recruitment, retention and citizenship attainment and considered possible changes they could make to improve their program in each of these areas. As a result, the program changed its recruitment tactics to target Chinese and Vietnamese neighborhoods. The program also hired an older Chinese-speaking teacher for the citizenship classes. The staff is now using data to evaluate the effect of these changes.

Purpose of This Guide

The purposes of this guide are to dispel misperceptions about data and its uses and to change how you think about data. The guide provides basic information needed to understand data and a model on using data to make decisions about program management and improvement. The guide also discusses data use for accountability and marketing. The main audience for this guide is adult education program directors, teachers, other program and state staff.

The focus of the guide is on using data collected for the NRS, the federally mandated accountability system for the adult education program. The NRS requires all adult education programs to collect a common set of measures of student demographics, participation and outcomes, and requires states to set performance standards on five categories of outcome measures. States report these data annually to the U.S Department of Education. Many states also have additional accountability requirements and measures collected by their local programs. This guide does not include a presentation of the NRS or any of the issues surrounding the collection of NRS data. Readers interested in more information about these topics should consult the *NRS Implementation Guidelines*, *NRS Survey Guidelines* and *Guide for Improving NRS Data Quality*, all available from the U.S. Department of Education or online (www.nrsweb.org).

Overview of the Guide

This guide presents basic information about the nature of data and how to use it from the point of view of local program staff. It assumes little or no knowledge of data use, although it also includes more advanced information. Throughout the guide, we have illustrated key concepts using examples and data from states and local adult education programs. While actual data are used, we have sometimes changed and

simplified the data to show our points more clearly. We have organized the guide into three additional chapters.

Chapter 2, *Data and Its Uses: Accountability and Marketing* begins with an overview of basic concepts about data, including the differences between qualitative and quantitative data. It also presents an overview of the topics that NRS data can address and concludes with discussions of how to use accountability data to evaluate your program's performance and to market your program.

The heart of this guide is Chapter 3, *Data for Decision-Making: Program Management and Improvement*. It discusses in detail a model of how to use data to make decisions about the management and improvement of your adult education program. The model goes from identifying issues, developing questions and analyzing data to making a data-driven change in your program and evaluating the results. The chapter provides guidance on developing questions to address with data, ways to present and analyze data and how to implement changes in your program. Several examples in the chapter from local adult education programs illustrate the concepts discussed.

The guide concludes with Chapter 4, *Using Data Effectively: What Every Program Needs*, a discussion of the systems and procedures needed in local programs to build the capacity to use data. The chapter outlines the basic requirements to enable local program access to data and reiterates the need for quality data through sound data collection procedures as a requirement for data use. The discussion also emphasizes the importance of human factors in building a data use culture in adult education programs, such as attitudes toward data and the need for collaboration and training. The chapter ends with summaries of how several states are promoting the use of data by their local programs for program management and improvement. The guide includes a glossary of terms and a bibliography of resources related to using data.

This guide is one of several resources developed by the American Institutes for Research for the Office of Vocational and Adult Education (OVAE) of the U.S. Department of Education for the project *Promoting the Quality and Use of NRS Data*. The purpose of this project is to develop resources and provide training to improve the quality and use of data collected for the NRS by the federally funded adult education and literacy programs authorized through the Workforce Investment Act (WIA). There are separate training materials developed to accompany this guide and an online course on using data, based on the guide, will be available in the fall of 2003.

Chapter II. Data and Its Uses: Accountability and Marketing

We often think of data as reflecting reality and having an authority that can be used to establish a fact or prove a point. Yet we also know that data can be misleading or manipulated, and most of us have learned to question or mistrust data, at least some of the time. The key to understanding and using data correctly is to understand what data measure and how they were collected.

In this chapter we begin by defining data in terms of their underlying dimensions and explaining foundational concepts that are central to understanding data. We review the importance of data quality and then discuss these concepts in relation to NRS data. We conclude this chapter with illustrations of ways to use NRS data for accountability and marketing.

THE DIMENSIONS OF DATA

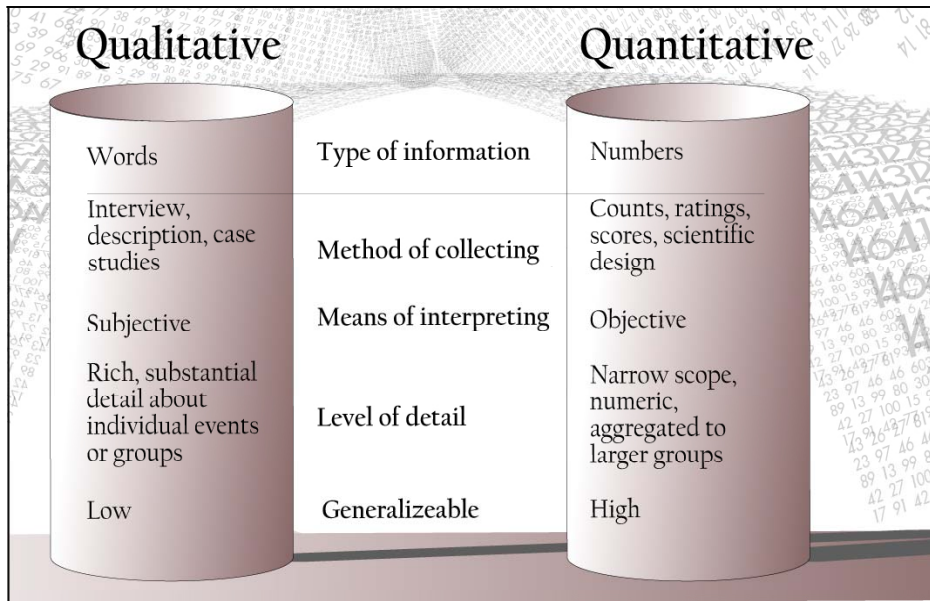
Data are information, “factual material used as a basis for discussion and decision,” according to Webster’s dictionary. We usually think of data as a special type of information that we assume to be true and that informs and helps us make decisions. However, the usefulness of data for these purposes depends on the type of data and data quality. Data can be qualitative or quantitative, with varying degrees of objectivity and richness and can reflect what they are intended to measure with varying degrees of accuracy. All of these dimensions affect how data can be used.

Types of Data

We usually think of data as numbers and statistics, what is known as *quantitative data*. This type of data is indeed everywhere: sports scores, automobile mileage, weather statistics or student enrollment numbers, for example. Another source of data, *qualitative data*, do not rely on numbers but use description and narrative to convey information. Qualitative data frequently appear in the form of case studies, narration or anecdotes. While both types of data have their uses and are often needed for understanding, they differ according to the type of information they provide, the methodology used to collect them and the interpretation they suggest. Exhibit 2.1 summarizes the differences between quantitative and qualitative data.

Qualitative data are usually very rich, providing substantial detail and information about the setting and participants. Qualitative research relies on interviews, content analyses and observers’ descriptions and the researcher interprets these data in terms of individual meaning and a holistic understanding of events. Quantitative data, in contrast, provides a narrower look at events, reducing them to numbers. Research methods collecting this type of data tend to be more scientific and includes experiments or quasi-experimental approaches, and measures include scores, rating and counts. Interpretations of data rely on statistical analyses and impersonal reports of findings.

Exhibit 2.1
Qualitative and Quantitative Data



While qualitative data often provide richer information, they are generally subjective and usually cannot be aggregated across dimensions to provide a general sense of a large group of people or events. Consequently, qualitative data are not amenable to generalizing to other settings or people. While more impersonal, quantitative data allow a more objective interpretation of their meaning. They also allow statistical manipulation, which permits aggregation and assists in generalizability. For these reasons quantitative data are typically considered “hard” data and often are more persuasive than qualitative data, frequently referred to as “soft” data.

Qualitative and Quantitative Data in Adult Literacy Programs

Student assessment offers a good illustration of the differences between qualitative and quantitative data. With a qualitative assessment, the teacher might obtain information on a student’s performance by talking to him or her about personal goals and perception of progress toward these goals. The teacher may also review examples of the student’s work, such as a portfolio, and consider the student’s performance in class. Through these sources of information, the teacher can obtain a holistic impression of the student’s literacy level and how well he or she is progressing. Indeed, teachers routinely do this type of assessment and most teachers can tell you their opinion about which students are more advanced, which are advancing and which are struggling.

A quantitative student assessment typically consists of a standardized or curriculum-based test. The teacher sets a prescribed time to administer the test and when completed, the student receives a numeric score. Often scores are normed or compared

against some sort of distribution, which allows the teacher to evaluate a student's literacy level according to the general population, other students, or according to criteria, such as specific competencies or skills. Through subsequent testing, a teacher can measure student progress by tracking test score changes.

Teachers and other adult educators are usually more comfortable with a qualitative approach toward assessment, finding the rich information it provides to be helpful in understanding their students and planning instruction. Such data often are invaluable for instructional purposes. However, this type of data is problematic for broader programmatic purposes – such as accountability, program management and program improvement – due to its subjectivity. The tasks and performance on which the teacher evaluated the student, for example, may not measure relevant skills or be at the appropriate level of difficulty. The teacher's judgment of student performance may be inaccurate or biased and another teacher may come to a different conclusion about the student's literacy level using the same information. In addition, since qualitative data are non-numeric, they cannot be aggregated easily to make summary data on how a class, program or state is performing on measures. They cannot tell you the big picture about a program – how much learning students achieve in relation to their instruction, for example, or the type of student that is likely to learn faster.

Quantitative data *can* answer such questions and are therefore greatly preferred for accountability and to assist in program management and improvement. Quantitative data are objective and can be used for summarizing and aggregating results in statistical analyses.

Data Quality

Like any other type of information, data are only valuable if they are accurate and reflect what they are intended to represent. You cannot make good decisions or judgments based on bad information. Consequently, high quality data is a prerequisite for using data in any meaningful way. Data quality are defined in two ways, by its *reliability* and its *validity*.

Reliability of data refers to the consistency of measurement – whether different people collect data the same way at different times. In other words, a reliable measure produces the same score no matter who collects it or when it is collected. Low reliability is the result of bad data collection procedures or a poor data collection instrument. If data collection procedures are not clearly defined or followed, or if staff is not trained in procedures, poor reliability is the result. Similarly, if the instrument used to collect the data – such as a form or test – is flawed, different people may complete it in different ways, again producing unreliable data.

Attendance data can have low reliability, for example, if one teacher records attendance when class starts and another records it at the end of class. With assessments, low reliability occurs when test administrators do not follow standardized instructions for administering the test. If one group of students gets standardized instructions and time to

complete the test and other students get different instructions and administration times, the resulting test scores will reflect error due to low reliability.

Validity of data refers to whether the data measure what they purport to measure. The more valid the data, the more it approximates the “truth” about what is being measured (philosophical issues about truth aside). For example, a score on a reading comprehension test has high validity if it provides an accurate indication of a student’s true comprehension ability; total attendance hours are a valid measure of a student’s class time, if attendance is measured well.

Producing reliable and valid data boils down to having well planned data collection procedures, effective staff training on these procedures and sound data collection forms and tests to record data. Producing quality data is difficult and requires an ongoing and continuous effort and investment. These efforts are essential for your program, however, since your data are meaningless and unusable unless they are valid and reliable. For the NRS, the Department of Education has invested considerable resources to assist states in producing valid and reliable data through guidebooks, technical assistance and training. The *NRS Implementation Guidelines* (2001) defines each NRS measure and outlines data collection procedures to enhance data reliability and validity. The *Guide for Improving NRS Data Quality* (2002) and accompanying training were designed to help states and programs improve their data collection procedures and data reliability. States have also invested their own resources to improve data reliability and validity.

Data Use for Adult Literacy Programs

The information most adult educators want to know about their programs falls into four categories:

- **Enrollment.** Program directors and teachers need to know the demographic characteristics of the students they are serving, whether there is over- or under-enrollment in classes and whether students are placed in appropriate classes.
- **Retention.** The length of time that students remain enrolled and the characteristics of students by their retention patterns are helpful information for planning and evaluating classes. Retention provides clues as to whether students find instruction valuable and whether the curriculum has a sequence conducive to keeping students.
- **Learning gains and outcomes.** Among the most important questions educators want to know are whether their students are learning, which students progress and instructional and class arrangements that affect learning. Program staff also wants information on other outcomes students achieve, such as passing the GED tests or entering community colleges.

- **Teachers and instruction.** Knowing which teachers are most effective can help in program management and student placement. Program staff can also use this information to identify professional development needs. Information about the content of instruction, such as curriculum and instructional goals, also helps program staff understand course content and whether it is appropriate for learners who are enrolled.

The NRS was designed to collect information in these areas for accountability at state and national levels. Although you may not realize it, you can also use the NRS data to understand your local programs and students in these same areas. Exhibit 2.2 shows the NRS data and other data programs frequently have available in their database for each of these topics.

Through the NRS, all programs collect basic information on their students’ backgrounds that can be used to examine basic issues of enrollment. Student attendance data offer opportunities to examine retention patterns, especially when combined with student characteristics. For example, programs can look at attendance by student age or other demographic characteristics. Since all programs must place students into an educational functioning level for the NRS, this information is available for examining student learning gains. However, the NRS does not require any data on teacher characteristics or instruction and many programs may not collect data on these topics.

Exhibit 2.2
NRS and Other Data Available in Local Program Databases
By Topic Area

Topic Area	Required NRS Data	Other Data
Enrollment	Student ethnicity, gender, age, employment status	Prior education, address
Retention	Contact hours	Dates entered, dates exited, enrollment history, program type (e.g., welfare, workplace)
Learning Gains and Outcomes	Educational functioning level, student goals	Test scores, obtained GED, entered employment, retained employment, entered postsecondary education, achieved goals
Teachers and Instruction	None required	Education, experience, full – or part-time status, age, gender, ethnicity, class curricula

The last column in Exhibit 2.2 lists other data that programs may collect or have available that they can use for analysis. Depending on your program’s data collection methods, you may have these data in your database or in student files or other sources. For example, students’ addresses are routinely collected and this information can help you determine whether your program serves students living in different neighborhoods. Students’ prior education gives you another variable for studying enrollment patterns and outcomes. You can study retention by looking at the number of weeks students attended

or whether they attended sporadically or continuously, if your program records the students' class starting and ending dates.

Most programs collect a great deal of information about student outcomes that they can use to examine student learning and achievements. Tests scores, from placement and progress assessments, are one obvious source of information, as are students' goals for attending. These data allow you to examine student goal attainment and progress in literacy development. If you have access to NRS follow-up data—which students get GEDs, enter postsecondary schools or obtain jobs—you can study student outcomes in this way. Finally, all programs can obtain information about their teachers, although this information is often not collected in a systematic way since it is not required by the NRS or most accountability systems. For example, demographic information about teachers, their prior education, experience and whether they work full- or part-time, is information you can use to look at student performance or characteristics in different classes.

WHAT DATA CAN DO

Often the only time teachers and other adult education program staff think about data is when they complete forms or send statistical reports to the state office. You or your colleagues complete attendance reports and test scores, fill in tables and send them off, perhaps never knowing how the information is used and never getting feedback about the data. You may simply see data as information you have to provide to get your grant. If this is the only way you think about data, you are missing all of the valuable ways that data can be helpful to you.

Ways to use data fall into two general categories. The simplest use of data is as a means to *demonstrate* and *describe*. The goal of data used this way is to present information to a general or selected audience. The second general use of data is for *decision-making*. This use of data is often more complex and usually suggests or is motivated by a desire to improve how things are done. In the next chapter, we discuss data for decision-making in detail. The remainder of this chapter presents concepts and illustrations for using data to demonstrate and describe.

Data to Demonstrate and Describe

A basic data use function is to describe something about your program or students. Providing this type of information is so routine that we often barely notice it as “data analysis” or using data. Typical examples include simple statistics such as the number of students enrolled, their average test scores and the length of time they attend classes. This information is usually provided to meet data requirements from a specific audience, such as for *accountability*. Another common use of data is for demonstrating what your program does to help convince an audience of the program's value. When data are used in this way it is sometimes called *marketing*.

Using Data for Accountability

The aim of accountability data is to demonstrate that services and programs meet their funding mandates, according to an expected level of performance. For adult education, these mandates include serving eligible students and demonstrating student achievements in literacy skills and other outcomes. The data elements and presentation format for accountability data are often prescribed into specific measures and reporting tables. The expected performance of accountability measures are quantitative goals, known as performance standards.

Through the NRS and state reporting requirements, you are probably familiar with accountability data. Your state has set performance standards on the NRS outcome measures and you report on them using standard forms available through your program's data system. Consequently, accountability data is a good place to start using data for program improvement.

The basic tables you prepare for accountability, such as for the NRS, can address some of the topics summarized in Exhibit 2.2. For example, these data can tell you:

- Who is attending your program – how many students and their age and ethnicity (enrollment).
- How successful your program is in meeting your outcome performance goals (learning gains).
- How many students are making educational gains by level (learning gains).
- How many hours of instruction are students receiving by level (retention).

You can make this information even more useful by comparing your program's performance to that of other programs' or the overall state performance. If your database allows for it, you can also compare performance by classes, teachers or type of students.

Exhibit 2.3 provides an example of a simple way to use accountability data to examine performance. Using actual NRS data, the table compares the performance of three programs in a state to the overall state performance on level completion in beginning ABE, low intermediate ABE and low secondary ABE. Along with the performance standard, the table shows the actual performance and the number enrolled for each educational level. This medium-sized state was successful in meeting its performance standards for the three outcome measures. Completion rates exceeded the standards by 6% to 9% for the state overall.

The state average completion percentages serve as a benchmark by which to judge the three programs' performance. Program 1, a fairly large program for this state, appears to be performing adequately, as it met the standards for beginning and low intermediate ABE, and just missed meeting the low secondary standard. In contrast,

Program 2 could be considered a high performing state, as it exceeded all three performance standards by substantial margins. However, this program is quite small, and its enrollment at each level might temper an overly positive evaluation of its performance. For example, while 91% percent of its enrolled students completed low secondary ABE, this translated to only 10 students, out of the 11 enrolled in the level. Finally, Program 3 performed poorly on the three measures, failing to meet any of the state performance standards. The rate of low secondary completions was particularly low – 15% below the state standard and 21% below the state average performance.

Exhibit 2.3
Accountability Data to Compare Performance: A State Example

	Beginning ABE			Low Intermediate ABE			Low Secondary ABE		
	Performance Standard	Percent Completed	Number Enrolled	Performance Standard	Percent Completed	Number Enrolled	Performance Standard	Percent Completed	Number Enrolled
State Total	20%	28%	5,442	25%	32%	6,055	35%	41%	1,855
Program 1	20%	21%	591	25%	27%	450	35%	33%	410
Program 2	20%	49%	61	25%	50%	70	35%	91%	11
Program 3	20%	14%	365	25%	18%	225	35%	20%	119

A table like Exhibit 2.3 is a useful tool for state and local staff to begin thinking about using data. It allows for simple comparison of a program to other programs’ performance. You can also construct this table to compare instructional sites with the overall program or even classes within a site or program by substituting site and class data in the table rows. Besides satisfying staff’s natural curiosity about how their class or program is performing, examining the table can raise several questions that staff can discuss. For example, why did Program 2 perform so well and Program 3 so poorly? Such differences could be due to the type of students served, placement and assessment procedures, types of classes offered or poor instruction. These questions can serve as the starting point for using data in more complex ways or to begin program improvement efforts.

Adult Education Report Cards

Another way to use and disseminate accountability data is to distribute a short, easy to read summary about your state or program’s performance. Several states are experimenting with this approach by developing an adult education “report card.” Modeled after a simple student grade report, adult education report cards briefly present program performance on key measures and often provide a brief description about the program, its students and other accomplishments. Report cards demonstrate the importance of accountability measures and can also help raise awareness of your program and its value to the community.

Alabama offers a good example of the report card approach. The state Department of Education has used report cards for several years for elementary and secondary schools. It recently expanded their use for adult programs to raise awareness of what adult education does, to provide information on state and program performance and to highlight possible areas for improvement.

The state produces a report card for each adult education program and for the state overall, shown in Exhibit 2.4. Each report includes the program's (or state's) performance on each NRS outcome, the state performance standards and a grade of A through F for each performance measure. The grade is assigned based on whether the program or state met, surpassed, or fell below the performance standard. The report card also includes data on student demographics, teacher characteristics and cost per student. The report cards are made available on the Internet and are sometimes published in local newspapers.

State staff reports that the report cards have been successful in raising awareness of the importance of program accountability to local staff. Local program staff is more motivated to provide better services and to collect quality data, knowing their report will be published and questions may be raised about their effectiveness if they fail to meet their standards (and get an "F," for example). The report cards have also been very helpful in increasing understanding of adult education programs and services, and the need for adult education.

Using Data for Marketing

In times of scarce resources and competition for students, adult educators often find themselves having to obtain additional funding, increase enrollments and gain more support from the community. This means persuading others of the value of adult education and its accomplishments. In business terms there is a need to *market* the program – and using data is essential to the success of any marketing effort. While a full discussion of marketing would require a monograph in itself and is beyond the purview of this guide, we summarize here some basic concepts for using data for marketing. The bibliography lists other resources for examining adult education marketing in depth.

The difference between using data for marketing and using data for other purposes discussed in this guide is that marketing efforts are usually aimed at a specific, external audience for the purpose of gaining resources for your program. For example, you might need to convince legislators or the school board to give you more funds or open new classes, or to sell adult education services to employers or partner agencies. Recruiting efforts also can be viewed as marketing to get new students. All such efforts require you to use data in a convincing and straightforward way.

Exhibit 2.4 Alabama State Report Card (Excerpt)

Adult education classes provide a second chance for people who did not graduate from high school. Through participation, students improve their skills in reading, writing, mathematics, communication, and computer skills. A diagnostic test is given to identify individual needs. An individualized plan of instruction is designed to help each student reach his or her educational goals. Materials designed for adult learners are used. Each student establishes personalized academic and work-related goals.

Individualized instruction is provided whether in a group setting or by using a computer with appropriate instructional software. The pace of the instruction is determined by the student. Interactive group instruction and peer tutoring are frequently employed. Classes are held in a variety of locations and settings to meet the needs of the students.

Adult Basic Skills Completion for 2001-2002

Adult education students, including GED prep students, must be at least 16 years old and not enrolled in school. Each student is given a standardized test and placed in one of six academic levels. Grades are determined by the percentage of students who complete that level compared to the state goal. Students must attend at least 12 hours to be enrolled.

Notes: The U. S. Department of Education determined all of the state goals listed below. Programs that deal only with Special Populations (SP) are not given a grade at this time. If there are fewer than 10 students enrolled in a level, No Grade (NG) is given. No criteria has been established for completion of High Advanced ESL.

Academic Levels	State Goal	Students Enrolled	State Percent Completed	Grade
Level 1 (less than 2 nd grade)	20.00%	1,690	32.78%	A
Level 2 (2 nd grade to less than the 4 th grade)	21.00%	4,542	28.56%	A
Level 3 (4 th grade to less than the 6 th grade)	26.00%	6,053	32.07%	A
Level 4 (6 th grade to less than the 9 th grade)	27.00%	6,550	31.80%	A
Level 5 (9 th grade to less than the 11 th grade)	32.00%	1,653	45.07%	A
Level 6 (11 th grade and above)	No Goal	1,108	41.70%	No Grade

English as a Second Language [ESL] Skills Completion for 2001-2002

Some adult education programs offer English classes for non-English speaking students. Each student is given a standardized test and placed in one of six academic levels. Grades are determined by the percentage that complete that level compared to the state goal.

Academic Levels	State Goal	Students Enrolled	State Percent Completed	Grade
Level 1 (Beginning ESL Literacy)	18.00%	466	34.55%	A
Level 2 (Beginning ESL Literacy)	18.00%	510	30.00%	A
Level 3 (Low Intermediate ESL)	24.00%	163	34.36%	A
Level 4 (High Intermediate ESL)	29.00%	94	32.98%	A
Level 5 (Low Advanced ESL)	29.00%	94	15.96%	F
Level 6 (High Advanced ESL)	NA	76	NA	No Grade

Achievements for 2001-2002

Adult education programs are expected to report certain achievements that occur outside the classroom. Only the adult education students who had that achievement as a goal are reported.

Achievement Levels	State Goal	Students Enrolled	State Percent Completed
Earns High School Diploma or GED	40.00%	8,995	33.59%
Obtains Unsubsidized Employment	25.00%	3,098	28.11%
Retains Employment	25.00%	2,222	19.08%
Enters Postsecondary Training or Education	25.00%	3,521	30.70%

Fund Allocation for 2001-2002

Local programs are funded by state and federal funds. The allocation amount is determined using the following method: 25% on local need (the number of adults without a high school credential are based on the most current Census data), 25% on total number of hours students attended, and 50% on local program performance. The cost per student is determined by dividing the total funds received by the total number of students enrolled. Programs attempt to keep the cost per student at or below the state average. Administrative costs are capped at 10%. Unusual conditions may require a higher administrative cost, but the Chancellor's approval is required.

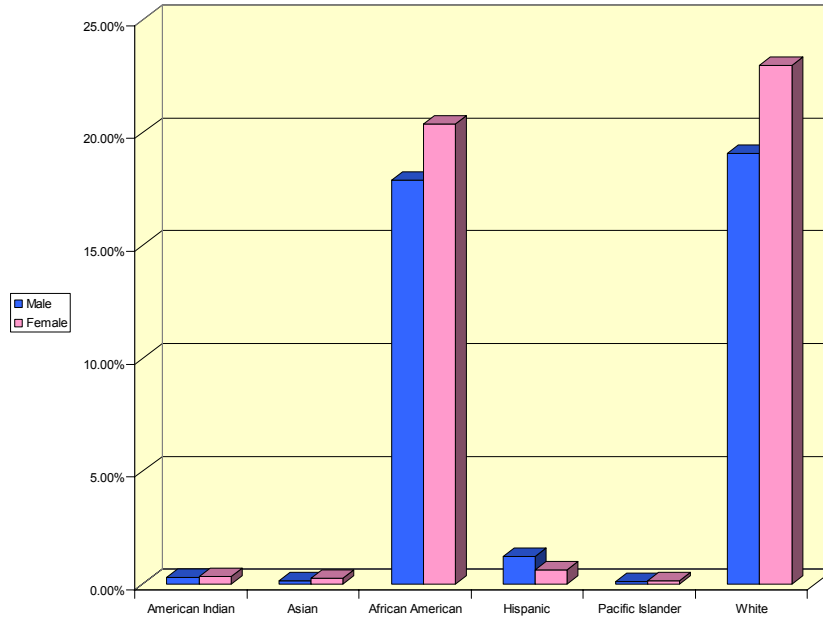
	State
COST PER STUDENT	\$610.62

Exhibit 2.4 (Continued) Alabama State Report Card (Excerpt)

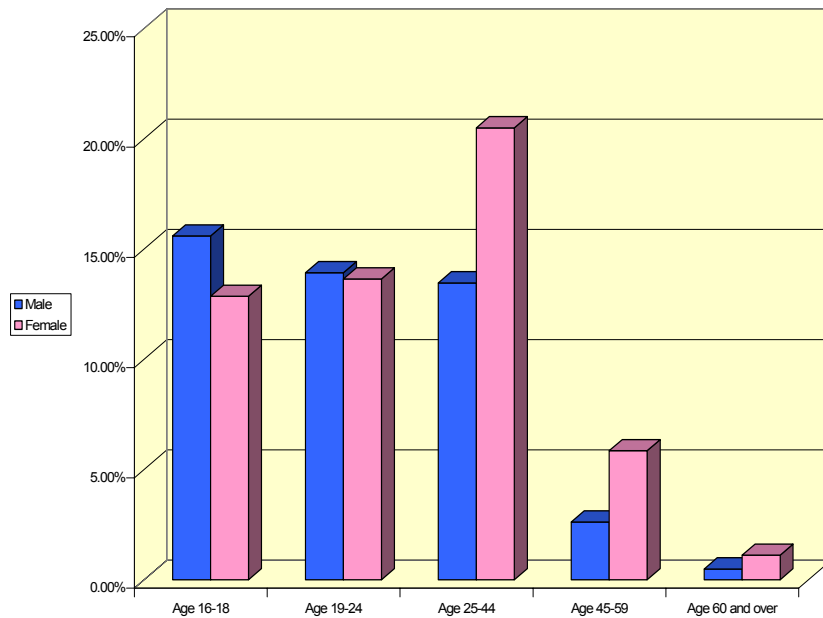
Demographic Information for 2001-2002

The following graphs depict the percentage of students in the adult education program according to sex, ethnicity, and age.

Percentage of Students by Ethnicity and Sex



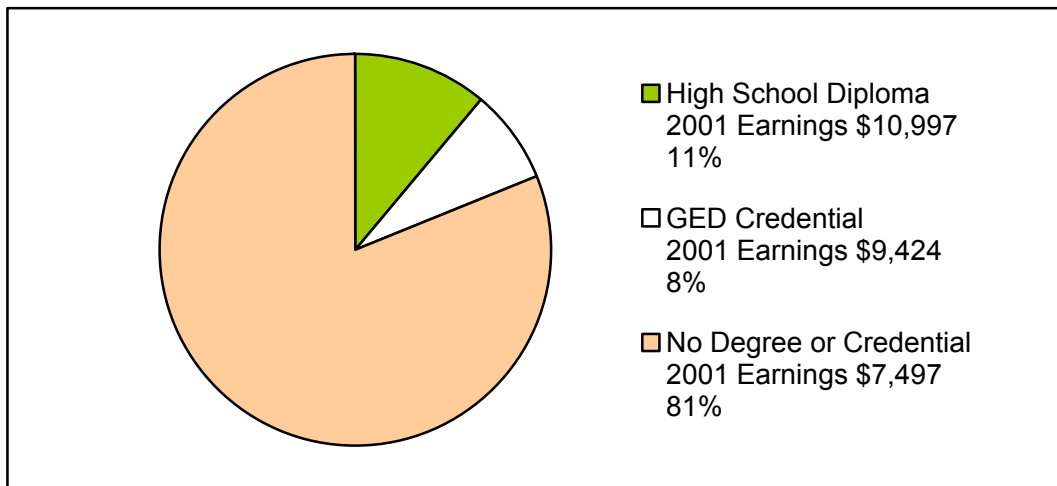
Percentage of Students by Age and Sex



An example from Iowa offers a good illustration. Adult education staff was concerned about research that had questioned the value of obtaining a GED credential to improve earnings. The study showed that adults who had obtained a GED did not earn more than adults lacking a secondary credential. Staff feared that studies like this would hurt funding for the GED program and affect student enrollment in adult secondary education classes. To address this concern, the state conducted an employability study to examine the relationship of student characteristics and program participation in adult education with earnings. One analysis looked at the relationship between GED attainment and earnings using NRS data and student income data available from data matching with state wage records.

The analysis found that for Iowa adult education students, obtaining a GED was related to higher earnings compared to students who did not have a GED or high school diploma. Exhibit 2.5 shows the comparison of the three groups of students and that students with a GED had over 25% higher earnings than non-credential students. The state used these data and charts in state marketing efforts to promote the value of GED classes.

Exhibit 2.5
Iowa Employability Study:
Highest Degree and 2001 Earnings



Guidance for Using Data for Marketing

This example highlights the key factors involved in using data effectively for marketing: a clear goal, directed at specific audiences, to convey a specific message. The data presentation was simple and easily conveyed by the graphic. Below we summarize these and other principles for using data for marketing, which are drawn from marketing research and the experiences of programs that have successfully marketed their services.

- **Clear goals.** A good marketing effort begins with a clear idea of what you want to achieve. Knowing your goals at the outset allows you to develop a focused message, guides you in selecting the data you need and determines whether your marketing is successful. The most common goals for adult education marketing are to recruit and retain students, obtain additional funds or resources, sell services to other agencies or to raise awareness and support of adult education.
- **Know your audience.** Marketing is an effort to persuade people to your point of view. You will be more persuasive if you know what your target audience wants to know about your program and what might impress them. Try to put yourself in the mind of your audience: what would potential students want to know about your program to help them decide to attend, for example? Funders, agencies and the general public also want to know about your students and program outcomes and what makes your program worth an investment.
- **The message.** There are undoubtedly many things you could say about your program and its successes. You must be selective and precise, however, in deciding what you want to tell your audiences. If you have clarified your goals and know your audience, you also will have a good idea of what you want to tell them. To be successful at marketing, you must convey your message unambiguously – for example, what students can learn from the program or that a GED credential helps one earn more money, as in the above example.
- **The data.** Once you are clear about what you want to accomplish and say to which audience, you are ready to begin the data analysis. Select the NRS data you need that directly addresses the targeted issue. For convincing audiences about the need for your program, for example, you could emphasize the number of students you served, their demographics and their retention. To demonstrate the success of your program, you will want to show outcomes your students achieved that support your message to the target audience. You may need to supplement your NRS data with data from other sources. In the GED example above, Iowa used student wage data. Census data is another way to supplement the NRS. For example, you can show you serve (or need to serve) students from low-income neighborhoods by matching addresses in your NRS database with data on Census tracts.
- **Presentation.** Marketing efforts provide you with only a brief opportunity to get the attention of your audience. You must deliver your message in a way that maximizes impact, without requiring a lot of time from the audience. For this reason, the way you present the data is extremely important. Graphic displays, like pie charts and graphs, are usually very effective since they allow you to convey a lot of information succinctly. Again, the picture you present must clearly convey your message and tell audiences something of direct interest to them.

In this chapter, we have discussed the basic information you need to know to use data and some simple ways to use data to demonstrate and describe what you do. Data can meet your accountability needs, promote interest in explaining your student outcomes, raise community awareness and help you market your program. An even more powerful use of data is in helping you make decisions about program management and improvement, to which we now turn.

Chapter III. Data for Decision-Making: Program Management and Improvement

In many professions, data are routinely used to make decisions and plan future action. Doctors plan courses of treatment based on data from tests on patients and research data. Economists suggest policy based on unemployment and inflation data and in business, data on potential customers and the economic situation help shape marketing and production plans. In education, however, we are unaccustomed to using data about our students and programs to inform decisions. Although the trend is changing in this era of accountability, most adult education programs still do not often incorporate data into their management and program improvement decisions.

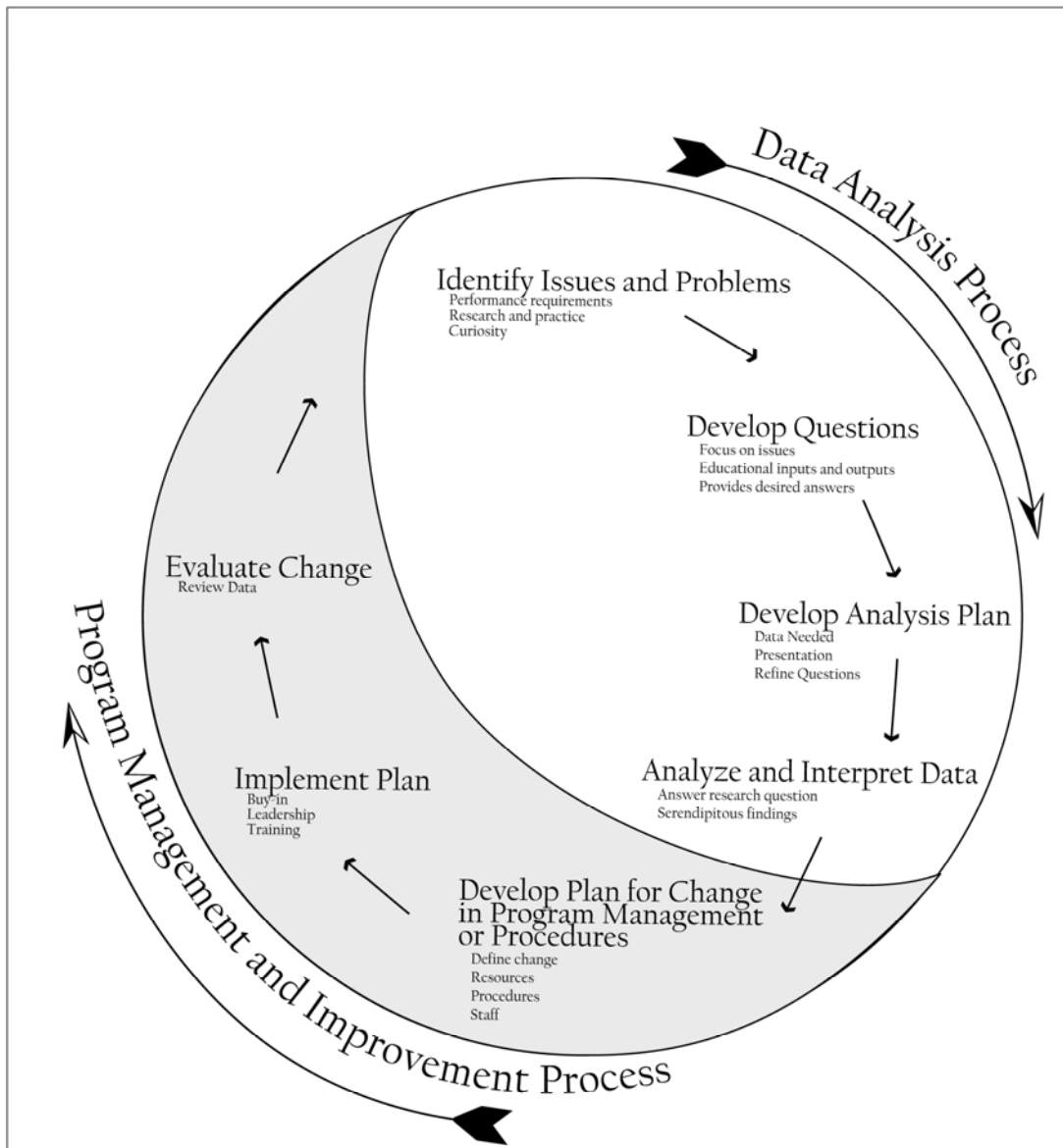
We would never trust a doctor who ignored data about our physical condition to prescribe treatment for us, nor would we be inclined to invest in a company that did not have a good, data-driven business plan. Yet, too often we make decisions about instruction, students and program policies without first looking at what our data tell us. In the past, program staff did not consult data because information was not collected, there was no access to data or because of lack of knowledge about how to use data. Through the NRS and other accountability requirements, program staff now has data available that can help in making decisions about managing programs and making improvements to provide better instruction and services. In this chapter we present a general model for using data for decision-making and provide step-by-step guidance on using the model. We illustrate the steps with NRS and student data from states and local adult education programs and conclude with examples from programs and states that have used data in their management and program improvement decisions.

DATA FOR PROGRAM MANAGEMENT AND IMPROVEMENT: A MODEL

Recently, much has been written about using data for decision-making and program management and improvement. Several models of this process now exist and the bibliography lists references to them. Exhibit 3.1 shows our model of the process, which incorporates the main features of similar models. We have divided the process into two parts, data analysis and program management and improvement. The data analysis process entails four steps: identifying issues or topics, developing questions to address the selected issues, planning analyses and analyzing and interpreting the data. The three steps within the program improvement process include developing a plan for making a change, implementing the plan and evaluating whether the change made a difference.

We show the entire process as circular, to emphasize the continuous nature of data-driven program management and improvement. The circular illustration also implies that the process can be started at several points, although our discussion of each step will begin with identifying issues and continue sequentially through the steps.

Exhibit 3.1
Model for Using Data for Program Management and Improvement



Identify Issues or Topics

When confronting complex issues such as student learning and adult literacy program management, the amount of information or data you have to process may seem overwhelming. You can quickly become lost or confused without something to guide and focus your efforts. Having specific issues or a framework as you begin will make your efforts to use data more efficient and successful. The identification of issues and topics may come from performance requirements, research or knowledge of good program practice or simply from your own curiosity.

Performance Requirements

Under the NRS, programs must meet performance standards for their student outcomes. In addition, many programs must meet other requirements set by the state or other funding agencies as part of their grant. For example, you may have recruitment targets, be required to serve certain types of students, keep students enrolled for a certain amount of time or pre- and post-test a required percentage of students. Many states also have instructional standards or quality indicators to promote program quality that your program must meet. All of these performance requirements are benchmarks by which to evaluate your program using data. They offer areas for you to investigate that will help you manage and improve the quality of your program. You can examine whether you are meeting the requirements and variations by sites, classes or types of students.

Research and Practice

Your knowledge and beliefs about what is good practice in adult education regarding instruction, retention, intake, goal setting and other areas can also guide you when deciding what data to examine. We all have our own ideas, based on our experience and education, about what is important to program management and you can use data to test these ideas. Research sometimes suggests other topics you might want to investigate with your program's data, such as a new way to recruit or retain students, a curriculum found to be effective or an instructional approach. Finally, you may suspect or know that something is not working right in your program and want to confirm it. For example, you might know you are not retaining students long enough, not reaching your target population or not meeting performance standards. Any of these issues can serve as the basis for study using your program's data.

Curiosity

Your interest in data may stem from simple curiosity – and this approach is not to be discouraged, as many important findings in all fields began just that way. You may just want to look at data to see what you can find out. Indeed, this practice is common among people who appreciate and get excited about data. When exploring data, you are bound to find patterns that indicate good practice or problems, or are otherwise worthy of further investigation.

Develop Measurable Questions

Regardless of how you decide on issues or topics to pursue, it is essential that you focus and refine them in a way to that allows you to translate them into measurable questions you can address with your data. The development of good data questions is central to using data for decision-making, as the questions determine the data you will examine and the conclusions you will draw. A poorly developed question cannot be answered or will provide an answer that is not helpful. Therefore, you should carefully consider and refine the questions you are asking before you continue.

Almost all of the questions we ask in adult literacy are about enrollment, student learning gains, retention, or teachers and instruction (see Exhibit 2.2). It is not difficult to generate questions about these issues. A few minutes brainstorming on your own or with teachers and staff is likely to produce a long list. You may find, however, that you are unable to use many of these questions, as they will be too conceptually cloudy or unable to be tied to data. There is an art to refining questions to make them useful in a data for decision-making framework and this skill improves with experience. The following guidelines will help you to develop measurable questions that you can answer with your data to get information that will help with program management and improvement.

Focus the Question: Reasonable and Measurable

A common mistake is to pose the question far too broadly for you to answer. The question may address the topic of interest but be unmanageable because you do not have the time or resources to address it. Your question is probably too broad when:

- It is not one question about a topic, but has several questions or topics imbedded within it.
- You need to collect much additional data to answer it.
- Its scope is too broad and would take several years of data collection to answer it.

For example, a question like “What is the effect of being in our program on our students’ lives?” is certainly a fascinating and important question, but it is unlikely that you would want to try, or be able, to answer it with your program’s data. First, there are clearly several topics and questions imbedded in it. The question does not specify which features of the program might affect students’ lives, nor what about students’ lives you would expect to change. A question this broadly stated could also take years of data collection and a major research study to answer adequately. Furthermore, a satisfactory answer would require data about students’ lives that you almost certainly do not collect for the NRS, meaning you would have to devise additional measures and data collection procedures. Finally, it may take months or years for any effect of attendance in an adult education class to affect students’ lives, longer than you would be able to follow-up and collect data on this topic.

A broad question could be a good start though, for by posing it, you will begin thinking in terms of data as you try to narrow the question. You can use the question as a starting point in a discussion with your staff about the aspects of the program that are likely to affect students and what about their lives might change as a result. Narrower questions are the desired result: Does learning to speak English help ESL students get jobs? Do students pass the GED tests? You *can* answer these narrower questions with your program’s data.

Break Down Questions: Educational Inputs and Outputs

A good question is one that is measurable and quantifiable. That is, the question suggests the data you need to answer it. One way to focus and improve a question for

data-driven decision-making is to see whether you can break it apart to identify educational “inputs” and “outputs.” Think of your program as providing educational inputs to students, such as instruction or other experiences, that result in a change in student behavior, or outputs measured through your data. Thinking about the question this way will help you evaluate whether it is a good question and also suggests ways you can narrow it.

For example, the question “Which of our classes help students more?” needs to be narrowed and sharpened before it can be of help. While the question does refer to educational inputs, “classes,” and outputs “help students,” the next step is to define more clearly what these inputs and outputs are. For example:

- Class (inputs):
 - Hours of instruction offered per week
 - Teacher characteristics (e.g., education, experience, full-time, part-time)
 - Curriculum of instruction

- Help students (outputs):
 - Improve test scores
 - Advance an educational level
 - Obtain a GED
 - Improved attendance

The educational inputs, or what your program does, are what happens in class that might affect the student. The amount of instruction offered per week, the characteristics of the teacher and the content of the instruction or the curriculum, can affect student outcomes or outputs. Learning outputs related to attending the class could include improving on tests, advancing an educational level or passing the GED tests. Better attendance might also be a student output you want to study, assuming that more regular attendance helps the student.

Breaking down a question in this way helps you focus on what you really want to know and makes getting the answer more manageable. For example, this analysis suggests that the original question about which classes help students more might be better phrased as “Do classes with more hours of instruction per week increase student test scores?” or “Does teacher training and experience help more students in the class get their GED credential?” These questions are more direct, can be related to NRS data you have available and can help you with program decisions on how to design your classes.

Ask What Will Lead to Program Improvement

A third consideration that will help you develop data questions is to ensure that your question will give you the information you need for program improvement. In other words, the question, when answered, should give you information that will guide you

toward a positive change in your program. While this may seem obvious, it is not uncommon for people to enter the data analysis process not really sure about what they want to know or whether they can use the information that eventually will result. On the other hand, if you enjoy data analysis you may get carried away and ask too many questions. “Nice to know” questions – which are interesting and satisfy your curiosity – should be avoided, unless you have the luxury of time and resources to answer them.

Once you begin breaking down questions you are likely to generate several more questions, some of which you will be unable to address or will not be helpful to you to answer. For example, above we broke down the general question about classes into three topics: instructional hours, teachers and curriculum. To decide which of the questions you want to pursue, think about which provide you with information you want to know and whether that information will help you make good decisions about your program. Knowing that more hours of instruction per week is related to improvements in your students’ test scores, for example, does not help you if you are unable to change your class schedules and instructional hours offered. Similarly, knowing if any teacher characteristics are related to learner advancements will be of little use to you in managing your program if you are unable to hire the teachers you need. Quite simply, ask for the information you need and can use.

Summary: Refining Questions

By way of summary, Exhibit 3.2 shows examples of questions at various stages of development for use in data driven decision-making. The questions in the first column are broad and unfocused. They address global concepts and imply a range of outcomes. Answering them fully would require collection of much data over an extended time. In addition, the issues they address – good teaching, program effectiveness – require several distinct questions.

**Exhibit 3.2
Developing Questions for Data-Driven Decisions**

Poor Question	Good Question	Better Question
Is my program effective for all students?	Do different types of students in my program achieve their goals?	How does attainment of a GED, entry into employment and education gain differ by student age and ethnicity?
How long do students have to be in our program to be helped?	Does longer retention in our classes help our students learn?	How many hours of instruction do our students need to gain an educational functioning level?
What is a good teacher?	Does student learning differ by teacher?	Do students in classes taught by teachers who have more education and experience have higher test scores?
Is my program helping the most needy adults?	Are low literate students learning less in my program than other students?	Are literacy and beginning level ABE students advancing levels at the same rate as students who enter in other levels?

In the second column, the questions have been narrowed and focused on data that are available in most programs. Program effectiveness in the first question has been defined in terms of student goal achievement and an outcome has been added to help clarify what good teaching and helping needy adults mean. These questions are more amenable to the next step, breaking them down to reveal the implied educational inputs and outputs for analysis. The last column shows questions that result from this breaking down process and phrasing the questions to give more specific answers. These questions are unambiguous, identify specific data for review and will produce answers that can help with program management and improvement.

Develop An Analysis Plan

Once you have finalized the questions, it is time to plan more explicitly for the analysis. While analysis plans can be quite formal and detailed, for our purposes a data analysis plan need only describe the data you need and how you want them presented. The plan should tie your question to the specific NRS or other measures needed and describe how you will present this information.

Data Needed

Much the way we broke down questions into educational inputs and outputs, you can break the inputs and outputs down to identify data you will need. As you go through this process, you must determine whether you need additional data and if so, whether you want to collect the extra data or refine your question so the additional data are not needed.

If you have a very simple question, or if you have asked your question quite specifically, the data you need will be readily apparent. For example, it is clear what data you need to determine whether older students attend class more hours than younger students. Most questions, however, are more complex and will benefit from a more formal deconstruction. One approach toward identifying data needs is to make a list or chart of the topics and related data for each component of the question.

Exhibit 3.3 shows such a chart (an expanded version of Exhibit 2.2) that is helpful for identifying data needs. The columns list the topics addressed by the question, the NRS data available, other data that might be available in your program's database and data that are not likely to be in your database. The table is constructed to illustrate the data needs for two questions: "Do teacher characteristics affect student learning gains?" and "Does student attendance and persistence differ by student characteristics and educational functioning level?"

Exhibit 3.3 Identifying Data Needs: Teachers, Students, Retention and Learning

Topic	NRS Data in Program Database	Other Data Possibly in Program Database	Data Not Likely in Program Database
<i>Do teacher characteristics affect student learning gains?</i>			
Teachers and Instruction	None	None	Teacher education, credential, professional development, experience, full – or part-time status, age, gender, ethnicity
Learning Gains	Educational functioning level, level advancement	Test scores	None
<i>Does student attendance and persistence differ by student characteristics and educational functioning level?</i>			
Retention	Contact hours	Dates entered, exited, enrollment history, hours per week, class meets	None
Enrollment (Student Characteristics)	Student ethnicity, gender, age, employment status	Prior education, address	None
Learning Gains	Educational functioning level, level advancement	Test scores	None

For the first question on teacher characteristics and student learning, there are measures of student learning available, educational functioning level and level advancement, which are NRS required measures. Many programs also record test scores in their databases, which could be used in this analysis. However, there are no data on teachers collected for the NRS and the program is not likely to have information on teachers in its database. To answer this question, the program will have to collect the additional information from teachers.

All the data are available, however, for the second question, on attendance and persistence. Since the NRS requires data on contact hours, student demographics and educational functioning level, programs collect all of these data. Many programs also would have the additional data needed to address the question, such as dates when students enrolled and exited and their test scores. The total weeks enrolled could be computed using the dates, allowing another measures of retention. Test scores allow for another measure of student learning.

Once you have conducted this type of analysis, you may find that the data you need are not available. However, you may feel the question is of such importance that you are willing to go through the extra effort to obtain the information. Some additional data, such as on teacher characteristics, can sometimes be collected easily. More often, you may find you do not have the time or resources to collect data and you will have to

either drop the question or refine it so that you can answer it with the data that you do have. For example, you could change the question on teachers and learning gains by looking at specific teachers or classes. You could compare classes taught by full- and part-time teachers or by teachers with advanced degrees and baccalaureate degrees. The refined question would then be: “Do student learning gains differ among classes taught by full- and part-time teachers, or teachers with advanced degrees?” You could address this question by identifying classes taught by teachers with the characteristics of interest and compare student performance among them.

Data Presentation

After questions have been decided and data elements identified, the next step is to plan how the data will be presented for review. While data presentations can be quite complex, most data analyses you will use for management and improvement of your program will be simple and often will be in the form of a report generated by your state or program database. However, a basic understanding of data presentation is essential, since often the type of presentation will determine what you actually find – or fail to find—in the data. Below we quickly review some of the basic approaches and concepts you are likely to encounter as you use data for decision-making.

Frequency tables. The most familiar form of data presentation is the frequency table. This type of table is appropriate for categorical data (e.g., ethnicity, gender) and in its simplest form, shows the frequency (sometimes referred to as the “N”), and percent falling into each category. You will often see frequency tables with two measures, called a two-way or cross-tabulation table.

Exhibit 3.4 presents examples of both forms of frequency tables. The simple frequency table shows percentage and number of students by ethnicity for a program and the two-way table shows ethnicity for each site in the program. While both tables provide the total ethnicity breakdown for the program, the two-way table gives more information about how the students are distributed across sites.

Exhibit 3.4 Frequency Tables of Ethnicity

A. Total Ethnicity

Ethnicity	Frequency (N)	Percentage
Asian	76	12%
Black (not Hispanic)	120	19%
Hispanic	202	32%
Native Hawaiian or Other Pacific Islander	6	1%
White (not Hispanic)	228	36%
Total	632	100%

B. Ethnicity by Site

Ethnicity	Site 1		Site 2		Site 3		Total Program	
	N	Percent	N	Percent	N	Percent	N	Percent
Asian	37	10%	39	22%	0	0%	76	12%
Black (not Hispanic)	67	17%	53	29%	0	0%	120	19%
Hispanic	145	38%	0	0%	57	80%	202	32%
Native Hawaiian or Other Pacific Islander	0	0%	0	0%	6	8%	6	1%
White (not Hispanic)	132	35%	88	49%	8	12%	228	36%
Site Totals	381	100%	180	100%	71	100%	632	100%

This additional detail in Table B demonstrates the advantage of tables that show more than one measure and that disaggregate, or break down the data into smaller categories. Site 1, the largest site, has an ethnic distribution reflected in the program total. Hispanic and White students are about equal in size and are the largest groups in the site. Site 2 has about half White students and no Hispanic students, while Site 3, the smallest site, has primarily Hispanic students and all of the program's Pacific Islanders.

Graphs and charts. It is easy to get overwhelmed looking at rows of numbers in frequency tables. The important relationships may not stand out easily, lost in a sea of numbers. Graphic presentations show data more clearly and often have a dramatic impact when showing large effects or important findings in your data. There are many different ways to present data graphically but we will focus on the most commonly used: bar charts, pie charts and line charts, as illustrated in Exhibit 3.5.

The pie chart shows program ethnicity data from Exhibit 3.4 in graphic form. Each ethnic group is shown as a slice of the pie, with size proportional to its overall percentage of the whole. The chart shows the preponderance of non-Hispanic Whites and Hispanic students in the program.

The bar chart shows the number of students enrolled by age in the state. The categories in this type of chart are displayed as bars, whose height is determined by the overall frequency or number of students in the category. This chart clearly shows that the number of 25-44 year old students enrolled in the state is much greater than that of the other age groups.

Line charts, like the one at the bottom of Exhibit 3.5, are appropriate when the data being studied are continuous measures (i.e., not categories), such as age, test scores or time. The example here plots pre- and post-test scores over time on a reading comprehension test. Students were tested shortly on intake and were given the post-test 12 weeks later. The average pretest score on the test was about 430 and the post-test average was 440. The chart shows the average student growth on this measure over the 12 weeks.

Averages and variation. When presenting data measured on a continuous scale such as test scores, we usually report the average score, which is computed by summing all the scores and dividing by the total number of scores. This average is called the *mean* and is probably the most frequently used statistic. Means are helpful for getting a sense of how a group scores on a measure. However, the mean does not always convey an accurate sense of the real “average” or what is known as the central tendency in the data. Means are misleading when there are some numbers in the distribution that are much higher or much lower than most of the others. For example, the mean is not usually a good measure of average income because some people may have extremely high incomes and others have no income at all. If you compute the mean income for the state of Washington and include Bill Gates, for example, the result will be much higher than the true average of that state’s residents.

A statistic that corrects for such extremes is the *median*, defined as the number where half the scores fall above it and half the scores below it. Medians are the appropriate measure of the average when there are great extremes in the low or high end, or range. For determining the average Washington state income, the median would provide a more accurate picture, since Mr. Gates’s income and that of other wealthy individuals, would not weight the average so highly in the upward direction. Another measure of the average is the mode, which is simply the number that occurs most frequently in the distribution. This measure, however, is normally used only when information on the most common score or response is needed.

Exhibit 3.6 shows an example of mean, median and mode of the average number of hours of student attendance reported for the NRS by 13 states. The exhibit has the states ranked by lowest to highest attendance hours. While the overall mean for the 13 states is 92.6 hours, the median (the number that half the states fall above and half below) is 85 hours and the mode, the most frequent average among these states, is 45 hours. Since there is such an extreme in the states’ average attendance hours, the median seems most appropriate as a measure the central tendency.

Along with presenting the mean or median, you often will want to include a measure of the variance within the data. The variance tells you how much the measures differ from the average and from each other. It is important to present variance measures, as they can provide valuable information for program management and improvement. For example, you might want to question why attendance or test scores are highly variable in one class but not another.

Exhibit 3.6
Instructional Hours per Student for Selected States:
Mean, Median, Mode and Variance

State	Average Hours per Student
State 1	24
State 2	33
State 3	42
State 4	45
State 5	45
State 6	48
State 7	85
State 8	91
State 9	102
State 10	126
State 11	176
State 12	185
State 13	202

Mean 92.6 Hours
Median 85 Hours
Mode 45 Hours
Range: 178 Hours (24-202)
Standard Deviation: 62.0

The simplest and most common measure of variation is the range – the difference between the lowest and highest score. In Exhibit 3.6 the range of average attendance hours among the states is 178, the difference between 24 hours and 202 hours. This high variation is common with student attendance, as in any class or program some students stop attending after one or two classes, while others stay for a relatively long time. Another common measure of variation is the standard deviation, which provides a sort of average variation of measures from the mean. Most software programs can compute this measure of variance routinely. The standard deviation for the above example is high, indicating attendance hours are highly variable among states.

Analyze and Interpret Data

With your research questions formed, measures identified and tables and charts in hand, you are now finally ready to analyze the data to find your answers. If you are new to data analysis, you should begin with simple data displays, like frequency tables and simple charts. You might also find it helpful to get assistance from someone who is more experienced with data. We offer a general strategy below on how to analyze data and then provide some examples for illustration.

- **Answer your question.** As you look at the data, keep your original question in mind. Make sure you have the specific data elements and categories that brought

you to the data and that the data match the inputs and outputs identified through your question. Avoid getting distracted by side issues that might come to mind as you work.

- **Look for patterns and differences.** Look for patterns that stand out and differences across categories and groups of students. Look for extremes – the highs and lows.
- **Use appropriate data and statistics.** Make sure the numbers you examine are appropriate: Do you need the median or mean? Are percentages computed correctly? Do you have measures of variation? Also be alert for categories that have small numbers of students – a small “N.” For example, you might notice a large difference in tests scores among groups of students, but one group has only a handful of students. Do not place much faith in small numbers.
- **Disaggregate the data.** Often the data and tables you will get are combined, aggregated totals of several levels of data. For example, the state NRS tables include the combined data from all programs in the state, your program data combines all sites and a site’s data combines all classes. While aggregate data tables are helpful to understand broad patterns and the big picture, they can mask important differences among sites or classes. Break down your tables and data into these smaller units to ensure you see the right patterns and draw appropriate conclusions. Exhibit 3.4 shows the importance of disaggregating data; other examples are provided later in this chapter.
- **Consider data quality.** Make sure the data you have are valid and reliable. Know how the data were collected and any problems that occurred in data collection. While quality may be difficult to determine, the data may offer you some clues. For example, look for holes in the data – lots of missing data or a patchwork of data – and for erratic student sample sizes. Large, unexplainable changes in the data across students, sites or time also indicate poor data quality. For example, attendance hours might be high at one time and low another, many post-test scores may be lower than pretest scores or demographics of students might radically change. Anomalies of this sort may indicate poor data collection procedures and data quality problems.
- **Draw appropriate conclusions.** If you do find patterns that answer your question, you will want to make a conclusion that closely follows what the data indicate. It is often tempting to interpret data and draw inferences that may not be warranted. Likewise you should consider alternative explanations for your findings – that is, other plausible explanations for the patterns you find. For example, if you find the number of Hispanic students is lower at one site than at others, you might be tempted to conclude that recruitment efforts are inadequate for that group of students. The data, however, may not necessarily support this conclusion. There may be no Hispanic students in the site’s service area, for example. Similarly, poor student test performance in one class compared to others

at a site may not indicate poor teaching. Consider other explanations but do not go beyond the data. One way to help you draw appropriate conclusions is to talk to your staff and staff of other programs to understand procedures and types of students that may have influenced the data.

- **Remember serendipity.** Serendipity is finding something that you were not seeking. Science is filled with stories of serendipitous findings and inventions – penicillin, X-rays, “post it” notes – that proved more useful than the original objects of study. As you examine data, keep your mind open to the unexpected. Often in answering one question, you will find that many new ones arise. Try not to dismiss something that at first may seem unexplainable, illogical or irrelevant.

Interpreting Data: Examples

Like learning a language or learning to drive, the best way to learn to interpret and analyze data is to do actually it, once you know the basic rules and a general strategy on how to approach it. In this section we discuss four examples about common program management issues facing adult educators. Each example is based on actual NRS data collected by local programs during program year 2000 – 2001 and frequency tables like those that local adult programs could generate through their data systems. We present additional examples at the end of this chapter.

Learner completions. For many programs, the most important student outcome measures for adult education are the number and percentage of students who complete an educational level. To gain an understanding of which students complete levels, one state conducted a comparison of level completions by student characteristics. Of particular concern to the state was the completion of younger students, aged 16 through 18. These students had been enrolling in higher numbers in recent years with the goal of obtaining a GED credential. The state was concerned that these students entered with lower basic skills and had lower completion rates than the older students that programs were accustomed to serving. Program directors worried that lower completion rates of younger students would adversely affect their ability to meet performance standards. The question they asked was: Do 16-18 year old students complete levels at a lower proportion than students of other ages?

Using NRS data, the state computed a table of the percentage of completions by level for ABE and ESL students. Students were broken into three age groups, 16-18, 19-24 and 25 and older. When program directors examined this table, shown in Exhibit 3.7, they were surprised that for ABE students, the reverse of what they expected was true: the older students had lower completion rates and the younger students had the highest rates of completion in all but one level. For example, 42 percent of the 16-18 year old students completed ABE beginning literacy, 35 percent completed low intermediate ABE, 54 percent completed high intermediate ABE and 34 percent completed low ASE. In contrast, the percentage of completions of students 25 and older in these same levels were 31 percent, 16 percent, 32 percent and 21 percent, respectively. On the other hand, in ESL the younger and older students completed levels at about the same rate and

students 19-24 years old had the most completions at the lower levels. In addition, there were few completions in the higher levels of ESL.

Exhibit 3.7
Percent of Students Completing Levels by Age

A. Adult Basic Education (ABE) and Adult Secondary (ASE) Students

Age Group	Beginning Literacy	Beginning ABE	Low Intermediate ABE	High Intermediate ABE	Low Advanced ASE
16-18	42%	17%	35%	54%	34%
19-24	34%	21%	22%	50%	21%
25 and Older	31%	15%	16%	32%	21%

B. English as a Second Language Students (ESL)

Age Group	Beginning ESL Literacy	Beginning ESL	Low Intermediate ESL	High Intermediate ESL
16-18	26%	11%	7%	5%
19-24	33%	24%	5%	0%
25 and Older	25%	18%	7%	5%

The state was also concerned that minority ABE students had different instructional needs and incoming skill levels than White students. Program directors wanted to look at completion level by student’s ethnicity. The question here was: Do minority students complete levels in the same proportion as White students? Exhibit 3.8 shows that the state’s concerns were justified for Black and Hispanic students. With only one exception (beginning ABE literacy level for Hispanic students) these students had lower percentages of completers at all levels of ABE. While lower percentages of Asian students in beginning literacy completed a level, Asian students’ completion rate was higher than White students’ completions at the two higher levels and about the same as other levels. However, the relatively few Asian students in the state cautions against making any firm conclusions about these findings.

Exhibit 3.8
Percent of Students Completing Levels by Ethnicity

Ethnicity	Beginning Literacy	Beginning ABE	Low Intermediate ABE	High Intermediate ABE	Low Advanced ASE
Asian (N=976)	20%	20%	29%	100%	40%
Black (N=6,742)	27%	14%	15%	28%	15%
Hispanic (N=7,723)	31%	15%	16%	32%	18%
White (N=9,751)	43%	21%	29%	61%	30%

These examples illustrate several of the points about data analysis that we discussed. The research questions were clear and tied to the data, allowing us to focus on the relevant patterns in the tables and not be distracted by the many rows of data. The disaggregation of the state data by student age and ethnicity allowed us to identify patterns we may not otherwise have seen and for the example just cited, the few Asian students in the state cautioned us about making too much of their different completion patterns. Finally, these data do not tell us why we found these patterns, although we may certainly speculate. For example, younger students may complete faster because their recent school experience may help them with school-based topics and tasks in ABE. They may also have a higher level of overall education than older students. Minority students may have lower education or language and cultural issues that slow their progress. This speculation should not be used to make programmatic decisions, but can help guide continued data analysis. Discussion with staff and students and review of other data will help narrow possible reasons for the differences.

Attendance and learning gains. The relationship of attendance to student learning is of interest to many adult educators. There is a general assumption that greater attendance will result in more learning, but no one knows how much instruction is needed for students to make a meaningful gain. Yet, this information would be invaluable for planning instruction and setting assessment policy. A local program administrator of a program that served low-level ESL students wanted to know whether there was a relationship between attendance and learning gains for his students. He also believed that students that attended more regularly had higher learning gains. His two questions were: Do ESL students with more attendance hours have greater test gains than students with fewer attendance hours? Do ESL students who attend class more often have higher test gains?

Exhibit 3.9 shows the two tables produced to answer these questions. Table A includes only students who took both a pre- and post-test, the Oral Basic English Skills Test (BEST). The table breaks students into three groups, based on their total attendance hours, which ranged from 21 hours to 165 hours. Much to the program director's surprise, the students in the three groups made about the same amount of average gain on the BEST. Students who attended fewer than 50 hours had slightly lower scores to start and on the post-test, gained about nine points. Students who attended most had slightly higher pretest scores and gained about 11 points. Their attendance hours were more than double the low-attending students, but this translated to only two points on the BEST.

However, when looking at the tests scores according to percent of classes attended, a different pattern emerged. Students who attended more than 75 percent of their classes showed a much greater improvement on the BEST than did other students, especially compared to students who attended less than 50 percent of their classes. The average gain for the students who attended over 75 percent of their classes was 19 points, while students attending 50% or less of their classes gained 9 points on average.

Exhibit 3.9 Attendance Hours, Rate of Attendance and Test Gains for ESL Students

A. Attendance Hours and Test Gains

Total Hours Attended	BEST Pretest	BEST Post-test
Less than 50 (N=157)	20	29
51 – 100 (N=186)	22	33
101 – 165 (N=147)	24	35

B. Attendance Rate and Test Gains

Percent of Classes Attended	BEST Pretest	Best Post-test
50% or less (N=164)	22	31
51 – 75% (N=171)	23	34
More than 75% (N=155)	21	40

This example illustrates that sometimes you do not find what you expect to find when looking at data. You may even find something that does not seem believable and hard to explain. Rather than ignore such findings, you should use them as an incentive to be creative and curious in your approach to data and to continue exploring what is behind the relationships. In this case, looking at how often students attended turned out to provide more insight into the relationship between attendance and learning than did looking at total hours attended. The next steps might be to try to figure out the reason for this finding – and what to do about it.

Assessment policy. Another example, about testing and assessment policy, underscores the importance of exploring data by disaggregating it into smaller units to enhance understanding. A large northeast state has a requirement that all programs pre- and post-test at least 50 percent of all students. In reviewing her NRS report, a local program director was dismayed to find that less than 48 percent of the 2, 180 students enrolled had been post-tested, despite hours of training and exhortations to staff on the importance of post-testing. Before deciding what to do – like going through another round of costly training – the director decided to look at the data. She looked at post-testing percentages by providers, which included center-based and satellite, sites for both ABE and ESL. She also looked at the post-testing rates according to the number of hours of instruction students had received. Her question when examining the data was: Does percent of students post-testing vary by site and by hours of instruction?

Exhibit 3.10 shows the tables produced to answer this question. Table A reveals that the ESL and ABE center-based sites actually exceeded the 50 percent post-testing requirement, and had post-tested 70 percent and 60 percent respectively. Only the satellite sites failed to meet the requirement. The satellite ABE sites seem to be a particular problem, having the highest enrollment and the lowest post-testing percentage.

Exhibit 3.10
Percent of Students Pre- and Post-tested by Site and Instructional Hours

A. Post-testing by Provider

Provider	Enrollment	Pre- Post-tested
ESL Center-based	500	350 (70%)
ABE/GED Center-based	500	300 (60%)
ESL Satellite	460	184 (40%)
ABE/GED Satellite	720	216 (30%)
Program Total	2,180	1,050 (48%)

B. Post-testing by Instructional Hours Received

Hours of Instruction Student Received	Percent Pre- Post-Tested
12 – 29 Hours	3%
30-49 Hours	60%
50 or More Hours	93%

Table B in Exhibit 3.10 shows that the amount of time a student is in the program – as measured by the hours of instruction received – is strongly related to whether the student is pre- and post-tested. Only three percent of students who received fewer than 30 hours of instruction were pre- and post-tested compared to almost all students (93 percent) who received 50 hours or more of instruction.

Based on the data, it is clear that the post-testing problem is limited to the satellite sites, especially the ABE/GED satellite site, and to students who did not stay long enough to be post-tested. The solutions suggested by these analyses are that the program should try to improve testing at the satellite sites and should work on increasing retention among students who stay fewer than 30 hours. The use of data to identify the program components and procedures that need improvement is a central purpose of using data for decision-making – and it is to data-driven change that we now turn our attention.

Develop A Plan for Change

The desire to improve the management, quality or outcomes of your program is probably the main reason you looked at the data in the first place. By going through the data analysis process, you may have identified one or more components or procedures of your program that you would like to change. To implement these data-driven changes, the first step is to develop a plan that describes what and how you will change, the people

who will be responsible for making the change and the resources you will need to be successful in the process.

Clearly Define the Change

Your data may suggest several changes or a general area where change is needed. For example, in the case just reviewed on assessment policy, the data indicated the need for better pre- and post-testing procedures at the satellite sites. However, the analysis did not tell us what specifically to improve. Similarly, in the example on level completions, the state found that some minority students were not completing levels at the same rate as other students. The analysis did not inform us as to why this difference occurs or what to do about it.

To make such decisions, you will need to use your own judgment and knowledge about what works and how your program operates. When contemplating such changes, it is critical to share the findings with staff, especially those working most directly in the area affected, get their perceptions on the reasons for the findings and discuss what can be done to improve. It is essential at this early stage of planning to define clearly the changes you will make and how you expect these changes to affect students, staff performance and outcomes. The changes you select should have a direct bearing on the outcomes you want to improve. If there is a recruitment problem, for example, define the specific recruitment procedures you will change and the types of people who will be targeted. For a retention problem, consider what you will do to keep students longer and how much longer you would like to keep them. If students are not progressing fast enough, decide the instructional and/or placement changes you might make and for which students you will make them.

Identify Staff Responsible for Changes

Your plan should identify the staff that will be responsible for making each of the proposed changes. As you assign responsibility, enroll each staff person as a partner and collaborator in planning the changes that you will require them to carry out. Ideally, each person should understand the need for the change, and how the change is to be carried out. Staff should also be empowered to implement plans to make the new procedures work.

In addition to including staff in planning and empowering them, it is advisable to provide staff with an indication of an expected level of performance. For example, if improving recruitment is the plan, inform the staff recruiters of the rationale and need for the changes you are proposing. Ask them to generate ideas that will address the problem and empower them to try out their ideas, while also giving them goals or a framework to define success.

Identify Needed Resources

You may need additional resources to implement your change. In your plan, list these resources that will make the change work. You may need tangible resources, such as additional funding, new teachers, additional space or equipment, or new curricula and instructional materials. You also may be able to reconfigure resources by making procedural changes in your program, such as by rearranging schedules and work hours, re-assigning staff to different roles or shifting tasks among individuals.

For many changes, you may need staff training on the new procedures. Your change plan should explain how you will train staff, who will be involved in the training and how long the training will last. Again, it will be important to get staff input into the training content and procedures to help ensure acceptance of the plan. Include plans for ongoing and follow-up training, especially if the change will take time to implement. Follow-up training is especially critical if the new procedures are complicated, new staff is hired or staff is likely to forget the changed procedures. For example, changes in intake procedures and instruction are likely to require more ongoing staff development, especially if the procedures are very different than what was done in the past.

Implement Changes

After your plan is finalized, you can begin to implement the management or programmatic change. It is never easy to implement change and the bigger the change, the more difficult the process may be. In addition, change processes are not linear; they are likely to occur in stops and starts. The implementation of the NRS within your state and program may be a good example for you to remember as you consider change.

There are many models and approaches for making organizational change and some are cited in the bibliography in this guide. Since the focus of this guide is on explaining how to use data rather than on organizational change, we provide only a brief summary of important elements to the change process, based on several published models and on the experiences of some states and adult education programs that have implemented data-driven change.

Staff Buy-in

Although some people welcome change, it is difficult for most everyone. It is hard to disrupt patterns and procedures that people find comfortable and predictable. As a result, skepticism or resistance is likely to be the first reaction to change. This resistance can be overcome if people feel the need for change and understand the reasons for it. Involving staff in the process can be key to developing understanding.

All change models emphasize the importance of staff buy-in to successful change. Depending on the scope of change, you may want to involve the whole staff or only those most affected to discuss the problems, perceptions of difficulties and proposed solutions.

Ideally, you will also want to involve these staff members in the entire data analysis process. Not only should staff have a full understanding of changes and the reasons for them, but they should be active participants in deciding on and implementing them. The greater the participation and consensus, the greater the acceptance and likelihood that the change will become established.

Leadership

Successful change efforts usually have strong leadership throughout the process and your efforts at change will be greatly enhanced with a strong leader. An effective leader can articulate a vision for the future that includes higher goals such as improving the program and helping students succeed. Besides setting a broad vision, a good leader can motivate people and can inhibit negative reactions by convincing people that the change is in their self-interest.

Effective leadership also entails having power over decisions and resources and the ability to coordinate and manage these resources. Since most efforts at change will require new or different allocations of staff or funding, the leader must have the ability to control these resources either directly or indirectly. If staff believes their efforts cannot be supported or implemented, the change process will fail.

Managing and Stabilizing Change

It is quite an accomplishment to have identified a need for change through data, planned the change, obtained staff buy-in and initiated the change. Once the new procedures are in place, the challenge is to continue and stabilize it. For example, we have all experienced the excitement of learning something new at a training or staff development conference that we try upon our return home. After a short time, however, the novelty wears off and we revert to our old habits. The same risk exists with procedural and organizational change. Initially things may change, but over time processes revert to the way they were before. Experts in organization change have identified the following ways to continue the change process and stabilize the change once it is underway.

- **Monitor changes.** As changes are implemented, monitor activities to ensure that new procedures are being followed and that old ways are not reasserting themselves. Monitoring can include reviewing data and reports, observing activities and talking with staff. Part of monitoring also includes identifying what has *not* changed, either because the new procedures are not working or something was overlooked during the planning for change. The monitoring process may identify the need for additional changes or further training.
- **Ongoing communication and feedback.** Successful change entails continuous communication and feedback from staff as the new procedures are implemented. You should hold regular meetings to discuss what is being done, the success of the implementation and any expected or unforeseen problems that have arisen.

This ongoing communication serves two purposes: it allows you to identify problems and take corrective action if needed and it keeps staff engaged in the change process.

- **Involve innovators and early adopters.** In any group, there are people who quickly accept and learn the new processes and are ready for new innovations and challenges. You should recruit these early adopters as advocates in the change process. You can use them in visible positions to serve as examples to other staff as formal or informal advocates at meetings and trainings and have them work with you in monitoring and evaluating change.

Evaluate the Change

After your new procedures have been implemented for some time you will want to look at the data again to try to determine the effect of changes. Before doing this, however, you should ensure that you have allowed enough time for the changes to show an effect in the data. Some changes will take more time than others. For example, recruitment changes might appear quickly by affecting the type of students who enroll. Changes designed to affect student learning will take much longer to appear.

The data and decision-making cycle shown in Exhibit 3.1 is now complete and you are now back where you started – identifying your topic and developing a question the data can answer. This time, however, the change you made will direct you specifically to the topic and question you asked. As before, you should frame the question around the specific issue the data can answer and identify the data elements as you proceed with the analysis and subsequent steps. You also will want to talk to your staff and perhaps the staff of other programs, as you evaluate the data to draw conclusions.

Using Data For Program Management and Improvement: Examples

To conclude this chapter, we present three examples of ways to use data for program management and improvement. Each example begins with a question identified through data analysis, a change that was implemented in the program and the result of this change. The examples include data adapted from real experiences of programs that have implemented similar changes.

Placement and Class Levels

As she was reviewing NRS tables of her program's performance, a local program director discovered that attendance and TABE reading scores for her beginning ABE classes were lower than for other levels. Exhibit 3.11 shows the data for the three lowest levels and reveals that both the percent of completions and average post-test gains on the TABE for beginning students were much lower than for the two other levels.

Exhibit 3.11
Level Completions and TABE Reading Scores by Level

ABE Level	Average Pretest TABE Reading Score	Average Post-test TABE Reading Score	Percent Completing Level
Beginning Literacy	340	371	28%
Beginning	445	457	17%
Low Intermediate	495	522	35%

The director discussed this finding with teachers and intake staff to try to determine whether the reason for this problem was placement procedures, the type of students in the classes or instructional methods. The teachers of the beginning-level classes observed that they had noticed that many of the new beginning-level students had very little education and that their entering TABE scores were low. Many of these low-level students seemed to be struggling with the class. Based on this discussion, the staff wondered: Does students' prior education affect their test performance and level completion? Exhibit 3.12 shows the table they reviewed to answer this question.

Exhibit 3.12
Level Completions and TABE Reading Scores by Years of Education

Years of Education	Average Pretest TABE Reading Score	Average Post-test TABE Reading Score	Percent Completing Level
0 –1	399	404	0%
2-3	429	455	18%
4-5	445	466	25%
More than 5	455	467	26%

The data revealed that the beginning-level included students who had virtually no education and that these students were not progressing. None had completed a level and their mean post-test score was almost unchanged from the pretest. Based on these data, the teachers and program director decided to separate the students with little or no prior education into a different class that had additional instructional emphasis on basic reading skills.

Managing Enrollment

While in the past, many programs have had an open-entry policy for enrolling students, the emphasis on accountability and more intense instruction has caused a rethinking of this approach in some states and programs. The director of a small Midwestern ESL program was considering changing to a managed enrollment policy for classes in his program to improve enrollment and retention. Teachers at his two largest sites had observed that attendance patterns were erratic and that many students were not

being retained. The director decided to examine the data for enrollment and attendance at the two sites over the last six months.

Exhibit 3.13
Retention and Attendance at
Two Sites With Open-Entry/Exit

Site	Number Served	Number Retained (Attend 12 hours or more)	Percent Retained	Average Total Weeks Attended	Average Total Hours Attended
Site 1	122	76	62%	17	113
Site 2	88	59	67%	15	109

Both sites offered an equivalent number of instructional hours, had about the same class schedules, and as Exhibit 3.13 shows, had similar attendance and retention patterns. At the first site, 62 percent of students stayed at least 12 hours and attended for an average of 17 weeks and 113 hours. At the second site, the 67 percent of students who were retained at least 12 hours attended for an average of 15 weeks and 109 hours.

Although the student attendance hours met their grant requirements, the director and teachers thought they could do a better job with retention by keeping more students for at least 12 hours. They decided to try limiting their open-entry policy. To implement this new approach, the program director decided to limit enrollment to the first three weeks after the class opened at one site and compare its retention and attendance with the other site, which kept its open-entry. Their data question became: Does limiting enrollment to the first three weeks of class improve retention and attendance compared to open enrollment?

Exhibit 3.14
Retention and Attendance at Sites With
Managed Enrollment and Open-Entry

Site	Number Served	Number Retained (Attend 12 hours or more)	Percent Retained	Average Total Weeks Attended	Average Total Hours Attended
Site 1 (Enrollment in First Three Weeks)	117	97	83%	22	160
Site 2 (Open Entry)	95	62	65%	16	111

Six months after the first site had operated under this managed enrollment policy, the program director again compared the two sites, as shown in Exhibit 3.14. The site

where enrollment was limited to the first three weeks showed a marked improvement compared to its previous performance and the performance of the other site. The percentage of students retained at least 12 hours increased to 83 percent and students attended an average of 22 weeks and 160 hours compared to averages of 16 weeks and 111 hours at the site with open entry. The results were so encouraging that the staff decided to implement the same managed enrollment policy at the second site and compare retention rates again next year.

High Intensity Instruction

A large adult education program in the northeast serves a wide range of students and offers both day and night classes at several locations to meet the needs of the community. Unfortunately, the program is having difficulty meeting its performance standards for retention and learning gains. The program staff suspected that the performance problems were due mostly to the night classes, which meet for fewer hours per week and serve many employed students who work during the day. To verify this, the program director looked at the enrollment, retention and test scores for the two types of classes, shown in Exhibit 3.15. As the staff expected, students in the night classes attended less and had smaller average gains on the TABE than students in the day classes. Night students attended only an average of 43 hours compared to 66 hours for day students and they gained an average of 43-46 points on the TABE, compared to the average 60-65 point gain for day students.

Exhibit 3.15
Enrollment, Attendance and TABE Gains
For Night and Day Classes

Class Type	Number of Students Enrolled	Average Hours Attended	Average TABE Reading Gain	Average TABE Math Gain
Night (6-9 Hours per Week)	665	43	43	46
Day (12-20 Hours per Week)	496	66	65	60

After discussing these differences at length, program staff thought that the lower level of learning gains for night students was due both to their lower retention and to the fewer number of hours offered in these classes. The night classes met three times a week for either two or three hours, providing only 6 or 9 hours of instruction weekly. In contrast, the day classes met 4 or 5 times a week for 3 or 4 hours per day, providing 12 – 20 weekly hours. Since the night students were employed and worked during the day (or after class), the staff decided to increase the intensity of instruction by offering more hours per week and having more frequent class meetings. They wondered: Would increasing hours per week of instruction improve retention and learning gains in night classes? The next year, the program director increased all night class meeting times by one day, so that they offered 9-12 hour per week. At the end of the year the staff reviewed the data again, as shown in Exhibit 3.16.

Exhibit 3.16
Enrollment, Attendance and TABE Gains
For Day Classes and Higher Intensity Night Classes

Class Type	Number of Students Enrolled	Average Hours Attended	Average TABE Reading Gain	Average TABE Math Gain
Night (9-12 Hours per Week)	623	39	40	49
Day (12-20 Hours per Week)	512	70	67	66

Unfortunately, the increased instructional hours did not improve retention or learning gains among the night students. Students in these classes still lagged below the day-attending students. In fact, enrollment and retention for night students were slightly less than in the previous year.

Although disappointed, program staff can continue to discuss why the increase in class hours might have failed in improving test scores. Perhaps the number of instructional hours increased was not enough to affect learning. The lower retention or number of instructional hours received by night students may also have been a factor in their lower level of learning. Another possibility is the type of student attending night classes. The night students may have lower incoming literacy levels than day students – which staff could examine by looking at test scores by student levels—or the night students could simply be too tired from working all day to absorb much in class. Whatever the reason, this example illustrates the importance of considering all possible explanations by exploring the data as you consider changing and improving your program.

Chapter IV. Using Data Effectively: What Every Program Needs

This guide has explored how data can help you do a better job as an adult education administrator or teacher. We have demonstrated how to use data for accountability, to meet the requirements of funding agencies; for marketing, to raise awareness about your program and attract students and support; and for program management and improvement, to help you plan, implement and evaluate changes in your program. We have also shown that you can use the NRS data you routinely collect for these purposes, with very little technical expertise and training.

Throughout this guide we have made one critical assumption: that your program has the systems and procedures in place to allow you to access your data. Access requires technical systems, expertise and a data use culture – attitudes, procedures and leadership about data use that make it a routine part of what you do. In this chapter we discuss both the technical systems your program needs to use data and the human factors needed to create a data culture. We conclude with a brief summary of how several states are using data for program management and improvement.

USING DATA: SYSTEMS AND CULTURE

Before you can use data, you must be able to retrieve it and analyze it in ways that will meet your needs. Unfortunately, many adult education programs lack this access to their own data, due to software limitations and other aspects of database design. Lack of quality data has been another barrier to data use by many programs. However, while good data collection procedures and technical systems are necessary for using data, they are not sufficient. It takes people to make these systems work and human factors also play a critical element in developing a data use culture.

Technical Systems

The NRS requires local programs to have an electronic, student-level database to store and retrieve information for the NRS and other accountability purposes. You probably have this type of system in your program and use it to create the NRS annual statistical report and other reports for accountability. While most databases have good data input capabilities, there is a wide variation among systems in their reporting functions – the ability to get information out of the system. Clearly, to use data effectively, your program needs timely access to data. Without it, all of the information and ideas in this guide will remain an academic exercise for you.

Database Reporting Abilities

When designing databases, developers spend a great deal of time thinking about data entry issues – the data elements and categories to include and the usability of the

system, for example. However, not nearly as much time is typically spent thinking about retrieving information, beyond planning for required NRS tables and other accountability reports. The resulting system often has excellent data entry but only limited reporting abilities. Sometimes the lack of reporting ability is due to limited resources, as developing database reporting can be very expensive. Now that the NRS has been implemented for several years, however, many states are focusing on improving access to data among local programs. Below we discuss four central considerations to developing local program data access.

- **Levels of access.** Local programs can have three levels of access to their data: no access, where the data system has limited or no retrieval or reporting ability; secondary access, where local programs must go through another entity (such as the state) to gain access; and direct access, where programs can generate their own reports on site. Direct access is ideal for using data at the local program level. When local program staff can produce the information when they want and need it, they are more likely to value data and use data more frequently. Secondary access arrangements are not as conducive to data use by local programs, since there is often a time lag after the local program staff requests the data. Unless the state or agency controlling the data responds quickly and accurately with the right information requested, secondary access arrangements will usually not work to promote data use by local programs.
- **Timeliness of data.** The timeliness of the data that are available for analysis also affects its usability for program decision-making. In some states, the database can be several months to a year behind, so that the data available are from students in the previous year. This time lag makes it impossible for programs to examine their current performance and to gauge the success of their change efforts. Staff has to guess about their current students, based on old data.
- **Report flexibility.** Many databases include pre-programmed reports that produce information that local staff frequently uses, such as class lists, attendance reports and NRS tables. Local programs can produce these tables simply by selecting the report from a menu. There are many advantages to these types of reports, including that they require no skill to produce, help in program management and provide timely information. The disadvantage of this type of report is that if staff is limited to these reports, they cannot get information to answer other questions they may have about the data. To allow a higher level of access, some systems allow local staff to create their own reports. User-defined reports are most conducive to using data effectively.
- **Usability of reporting features.** The ease with which staff can produce reports also has a direct effect on data use among local programs. Report writing software can be almost trivial to use, such as by having users select the data and reports they want from a menu, or through a “wizard” approach that walks one through the process. At the other extreme, very sophisticated software may require some programming or statistical ability to produce the report desired. Clearly, software

that is easier for local staff to use is more conducive to promoting data use. On the other hand, easy to use software is often more limited in its reporting capabilities. You should determine the approach to use according to the ability level of local staff and the type of data analysis that they will be performing.

The ideal data system for reporting and using data is one where local programs have direct access to real time data through flexible software that is easy to use. This ideal can be hard to achieve, however, due to cost, compatibility of reporting software with your database and training involved. The ideal approach also requires that the database has been set up in the beginning with these features in mind. You should strive for the best balance of these features when developing report-writing capabilities. Many states are using the Internet as a platform for their NRS databases to allow for easier reporting and this approach appears promising.

Quality Data Collection

Data from even the best data system is of little use if it is reporting erroneous and incomplete data. We have made this point earlier in this guide, but it is worth repeating again: high quality data are essential to the effective use of data. Otherwise, as the adage goes, if you put garbage in, you get garbage out.

It is often easy to spot really bad data. Indicators include high amounts of missing data, great extremes in data (such as both excessively high and low scores), out-of-range scores and nonsensical or unexplainable data. However, other data problems are subtler. For example, missing student demographics or test scores might be made up or guessed but appear correct in the system. In addition to good reporting capabilities of your database system, you need quality data collection procedures before you can use data.

The U.S. Department of Education has provided training and technical assistance to states, developed a web site and prepared three guides that describe definitions and procedures for collecting quality NRS data: *NRS Implementation Guidelines*, *NRS Survey Guidelines* and *Guide for Improving NRS Data Quality*. Rather than repeat the content of those guides, we offer Exhibit 4.1, a brief summary of the important components of a quality data collection system from the *NRS Data Quality Guide*.

Exhibit 4.1 Components of a Quality Data Collection System

- Staff has clear descriptions and understanding of their roles and responsibilities for data collection.
- Program has ongoing training on data collection.
- Program has an error-checking and quality control system.
- Staff regularly reviews data to identify missing and inaccurate data.
- Clear definitions for each measure have been established.
- Program uses standard forms, tied to the program database, for collecting data.
- Data entry procedures into a relational, student-level database are clear and timely.
- Staff has timely or direct access to information from database.

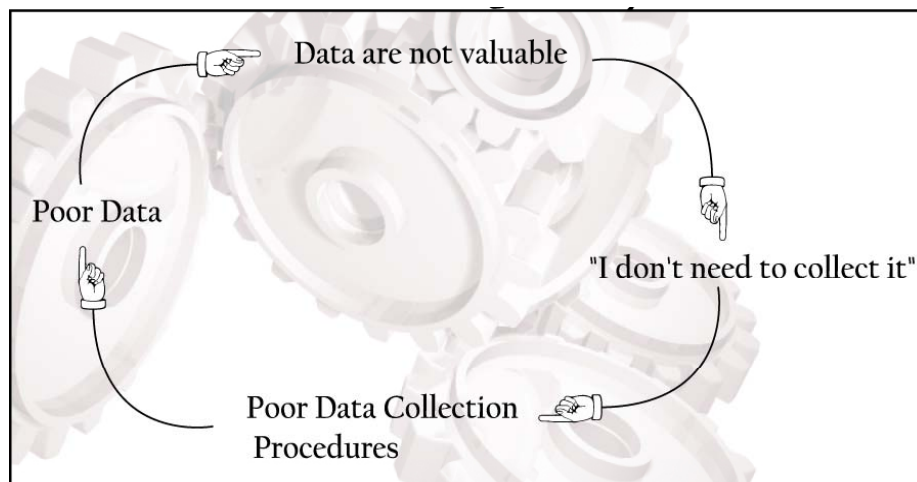
The collection of quality data requires that staff knows their roles, has clear responsibilities in data collection and receives ongoing training on data collection procedures. Staff also must monitor data collection and have quality control procedures to review data for errors, missing and inaccurate data. Quality data collection also requires clear definitions of measures, data collection forms that accurately reflect the measures and timely data entry into the program's student level relational database.

While sound procedures and systems are essential to collecting high quality data, people – local program staff – must implement procedures and collect the data. The attitude of staff toward data collection is therefore critical. An effective way to build staff appreciation for data is to show how data can be used. When staff believes that data are valuable they will take more care in data collection and produce higher quality data. If staff believes data are not valuable, poor data collection procedures result. Thus, there is a dynamic relationship between using data and data quality: quality data are necessary for using data, and using data promotes data quality. Exhibit 4.2 shows the relationship between bad attitudes about data and bad data collection.

Human Factors and Data Use Culture

As illustrated in Exhibit 4.2, attitudes affect data collection: data quality and data use are intertwined. Consequently, building a system or culture of data use in your program requires addressing these human factors by changing attitudes and providing leadership. You can ingrain the data use process further in your program through a collaborative approach and training.

Exhibit 4.2
Data Quality Circle



Attitudes and Leadership

As we have discussed, there is often a general mistrust of data among adult educators and many misperceptions about how and why data are used. One of the first challenges a program may face in trying to build a data use culture is to change these

attitudes and the resulting resistance to data. Changing staff attitudes is not easy, especially if the process involves a substantial change in perceptions, and there is likely to be a period of resistance. In Exhibit 4.3, we list some of the responses to NRS implementation we have observed, which may affect attempts at using data.

Exhibit 4.3 Five Stages of NRS Implementation

- **Anger.** “I can’t believe this!! They have *got* to be kidding. This NRS drives me crazy!”
- **Denial.** “This stuff will never last. There is no way I’m changing anything.”
- **Depression.** “This NRS is going to ruin everything. I can’t teach or help my students anymore.”
- **Acceptance.** “Let’s make the best of it. Maybe we *can* do this and get something out of it.
- **Appreciation.** “Having data on our students and instruction is really wonderful! We can really use it for program management and improvement.”

It is almost impossible to get staff to accept a change like using data if they are angry or depressed about it or believe it is only a passing phase. Once people have finally accepted this new approach to data, real progress can be made toward what we refer to as the appreciation of data. A strong leader or program director can set the tone and example for building this appreciation.

In the last chapter, we briefly discussed the importance of leadership in bringing about change. Leadership can also help in building a culture of data use. By articulating a vision about the benefits of data for program improvement as a means to help students, for example, a leader can interest and motivate staff and inhibit negative reactions. The leader can also unify staff to achieve this vision through the collaboration and training needed for successful data use.

Collaboration and Training

All efforts to incorporate data use for program management and improvement require a collaborative staff effort. Collaboration also helps overcome resistance and builds motivation and interest in using data within your program. A collaborative approach will help you get the mix of people you need to use data well. A strong data use team might include the program director, or other program authority to ensure administrative support; teachers to help generate ideas and interpret findings; staff with at least basic skills in developing questions and interpreting data; and a data technician or analyst to develop and produce the actual data reports from the program’s database.

By bringing these requisite skills to the process, collaborating with staff in the areas below will help you establish a strong data use culture in your program.

- **Orient and build support.** Periodic meetings with staff to explain your purposes and basic data use concepts will help you build support for your efforts. You can use such meetings as an opportunity to emphasize the importance of data beyond accountability, to marketing, program management and program improvement. You can use later meetings to generate ideas for questions and analysis and to discuss findings and data-driven changes.
- **Generate ideas.** Program staff is an invaluable source of information that you can use at all phases of the data analysis-program improvement cycle discussed in the previous chapter (see Exhibit 3.1). Teachers and other staff in closest contact with students can tell you what they think is working and what needs improvement, help formulate and refine questions, and help collect supplemental data or other information you might need. They also can help interpret the patterns and findings in the data – why student progress, retention patterns and enrollment issues, for example.
- **Discuss results and solutions.** As the examples in the previous chapter illustrated, the data often can identify trends but cannot always explain the findings. There are usually several possible competing explanations for what the data show. Staff that knows the program, instructional approaches and students often has insights into patterns that will help you narrow the plausible interpretations. In addition, if you want to make a management change or implement an improvement, you may need staff help deciding what to change and how to change it. Not only can staff help you set a course for change, but if you have been collaborating all along, the need for change and its implementation will be smoother and likely to be more successful.

As with all improvement efforts and programmatic changes, staff training is a central aspect of successful implementation of a data use culture. Staff do not have to become statisticians or experts at using and analyzing data, but only need a basic understanding of the uses of data and a general understanding of the data use process. With this knowledge (and some hard work), you and other staff may come to appreciate the importance of data as an effective tool for program management and improvement.

STATE EXAMPLES

Over the last few years, several states have been working toward building data use by local programs as part of their program management and improvement process. To conclude this guide, we summarize the approaches of five states toward building a data use culture. Each state has put a slightly different emphasis on the process. Delaware and Kansas work directly with local staff, often using NRS tables. Iowa has developed a benchmark setting process that locals can use to help set their performance standards and improve performance. Idaho has adopted an explicit program improvement emphasis, with data analysis as an important component. Massachusetts has invested considerable resources into data collection and reporting, so that local programs and the state can take a total data quality and data use orientation.

Delaware

Since fall of 2001, local program directors and state staff in Delaware have met regularly to receive training on using data for program improvement. The state director began the trainings to teach program directors to use data to reflect on classroom and instructional design and to better manage and improve their programs. Achieving this goal involves encouraging program directors to generate questions (and possible solutions) from their own program data, to read state and local NRS tables, and to learn to generate their own reports and compare them with state-level data. The state provides the program directors with report writing software to generate the additional tables discussed at the trainings.

The first trainings focused on reading state NRS tables and comparing local program data with the state-level indicators and performance standards. In later trainings, the directors examined data on specific student groups to reflect on the impact of state policies and procedures. For example, the directors examined completion rates and outcomes of students of different ethnic groups and age, as well as the consequences of the state's goal setting policies. Participants were taught how to analyze NRS tables using a classroom design and instructional perspective, discuss their interpretations of tables, develop hypotheses on the results, discover relationships and interactions and finally, make suggestions for program improvement. Program directors are encouraged to go through a similar process of question generating, examining tables and sharing and discussing their findings with teachers.

Exhibit 4.4 shows a table used at a recent training that was designed to demonstrate how to compare educational level completion for different groups of students. The table presents completions in the state by gender. Table A shows that males in high intermediate ABE and low ASE completed these levels at lower rates than females in these levels. Table B shows that fewer male students in low intermediate ESL completed this level than females in the level.

Exhibit 4.4 Educational Functioning Level Completions by Gender

A. Adult Basic Education (ABE) and Adult Secondary (ASE) Students

Gender	Beginning Literacy	Beginning ABE	Low Intermediate ABE	High Intermediate ABE	Low Advanced ASE
Male	36%	16%	19%	38%	17%
Female	30%	19%	25%	51%	36%

B. English as a Second Language Students (ESL)

Gender	Beginning ESL Literacy	Beginning ESL	Low Intermediate ESL	High Intermediate ESL
Male	31%	23%	7%	17%
Female	22%	17%	17%	6%

Kansas

In Kansas, using data effectively goes hand in hand with year-round professional development and performance-based program improvement. The state has implemented a performance-based funding system, which results in a strong motivation among local programs to meet their performance standards. The procedures established for continuous program improvement are taken seriously at the state and local level – especially since recently, three programs were defunded because they did not meet their performance goals.

All of the state’s local programs are responsible for developing an individualized program improvement plan, based on their performance. Program staff generates quarterly reports; identifies potential problems, based on whether the program is meeting its performance standards; and identifies a plan for improvement in any problem areas. The program then submits the plan for state approval.

The state provides comprehensive training on using the data in these reports three times a year: at the summer institute, in the fall, and at the end of the year. Central to the trainings is the philosophy that everyone is responsible for collecting data; that accountability is part and parcel of the duties that come with being a teacher. The trainings are geared differently to the two main purveyors of the data, teachers and administrators, specifically as it relates to generating accurate and useful reports and developing the annual improvement plan. The training covers areas like procedures, definitions, and how to read tables accurately. To supplement these trainings, a contractor provides individual technical assistance to programs on an as-needed basis. Exhibit 4.5 shows an example of an exercise that leads to the development of a local program improvement plan.

Iowa

The Iowa Department of Education recently developed a seven-step Continuous Improvement Benchmark Model for adult education programs. The core purpose of this model is to provide local programs with a field-based process to assist them in setting realistic and appropriate performance levels for the NRS and state mandated outcome measures. The model also guides local programs’ efforts for using data for program management and improvement. There are seven steps in the model, shown in Exhibit 4.6:

- **Step 1. Plan your Benchmark Strategies.** Review the state and local plan to identify previous and projected benchmarks and examine the relationship between local/state and state/national benchmarks. This process allows programs to identify exactly what data are needed and the resources available to collect the data.

**Local
Program
###10**

**Exhibit 4.5
Sample Activity
Kansas Board of Regents – Adult Education
Data Quality Workshop****

To help you and your staff prepare for the workshop, please review your FY02 4th Quarter Report. Complete the information indicated below and answer the questions on page 2. Please bring your completed form to the Data Quality Workshop, where you will be asked to share this information.

Learner Educational Functioning Level	A. # participants (Report 1)	B. Total attendance hours (Report 1)	C. Average hours per participant (B+A)	D. # comp. level (Report 18)	E. % comp. level (Report 18)	F. # separated before completed (Report 24)	G. # with CASAS Diagnostic Pre/Post-tests (Reports 25, 26)	H, # completers who completed a level by pre/post-testing (Reports 25, 26)	I. % completers who completed by pre/post-testing (H+D)	J. % participants who completed a level by pre/post-testing (H+A)
1	8	603.00	75.38	7	87.5%	1	7	5	71.4%	62.5%
2	14	966.50	69.04	13	92.9%	1	11	11	84.6%	78.6%
3	14	748.00	53.43	13	92.9%	0	12	9	69.2%	64.3%
4	20	739.25	36.96	11	55%	2	10	4	36.4%	20%
5	8	200.50	25.06	7	87.5%	1	4	1	14.3%	12.5%
6	3	108.75	36.25	3	100%	0				
7	5	637.50	127.50	5	100%	0	5	5	100%	100%
8	15	2,135.25	142.35	12	80%	2	13	10	83.3%	66.7%
9	24	3,503.50	145.98	19	79.2%	1	20	19	100%	79.2%
10	34	4,694.20	138.06	30	88.2%	2	31	29	96.7%	85.3%
11	16	2,216.75	138.55	14	87.5%	1	15	12	85.7%	75%
TOTAL	161	16,553.20	102.81	134	83.2%	11	128	105	78.4%	65.2%

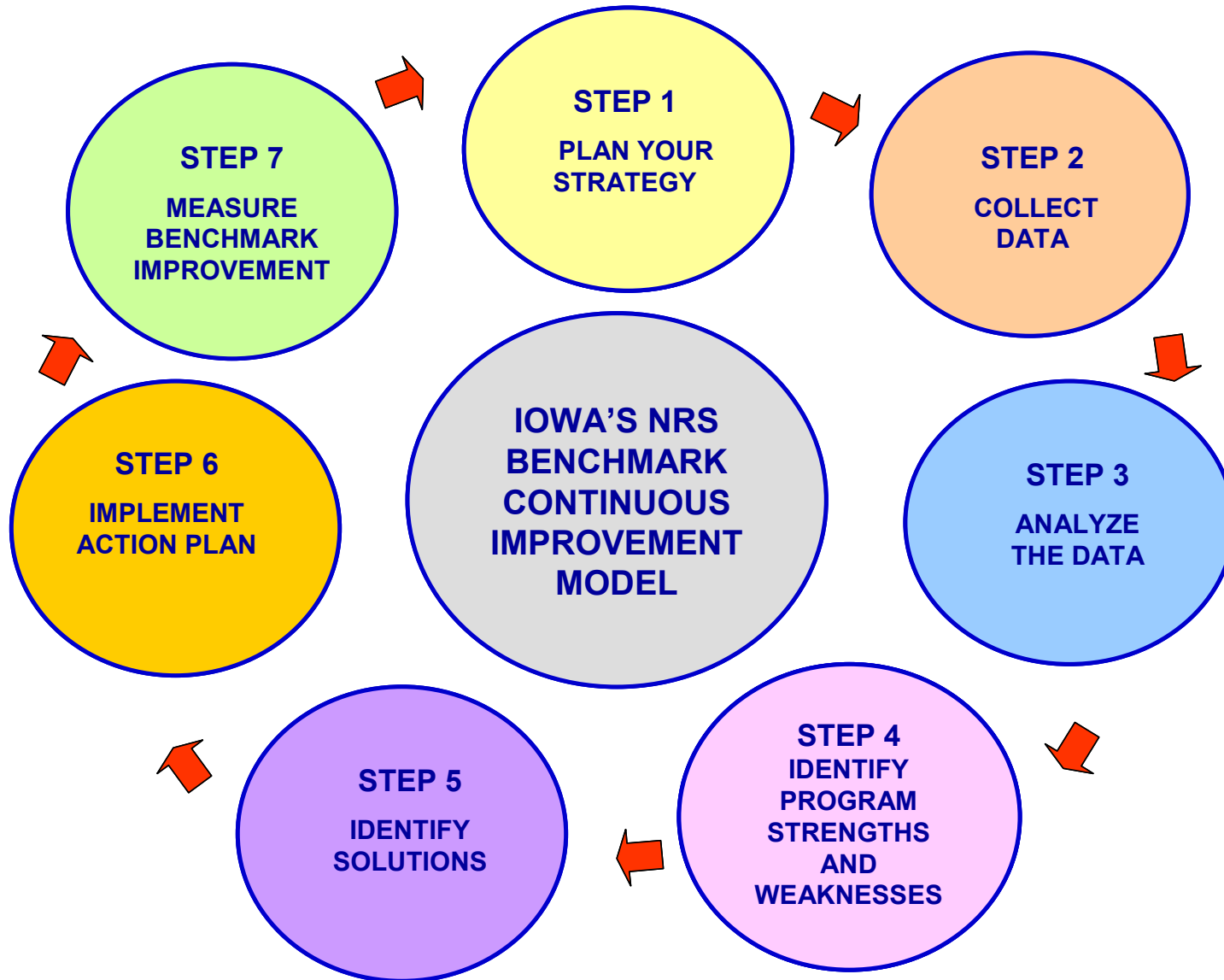
**To complete this table use data from your FY02 4th Quarter Report

Using Program Data from ABE2000

1. Examine the data you have listed in the table. List two observations that you have based on your review of the data. For example, you might have observed that while the average hours for 2 of the ABE learner educational functioning levels were lower than the other 4 levels, the percent completing a level was the same or higher than the other 4 levels.

2. Based on the observations that you have made, please list three other types of data about the learners and/or the overall program that you would want to examine to explore further the observations you have listed. The additional data that you identify can come from any source.

Exhibit 4.6
Iowa Benchmark Development Process



- **Step 2. Collect Data.** Programs collect student demographic information, administer pre- and post-tests, determine learning gains, and collect other core outcome measures.
- **Step 3. Analyze Data.** Programs ask whether the data collected are accurate, reliable and current. They compare local benchmarks to state and agency benchmarks, examining pre- and post-test scores, enrollment, staff development activities and core outcome measures.
- **Step 4. Identify Program Strengths and Weaknesses.** Programs examine the data to identify sites, classes, and/or teachers that meet or exceed benchmarks and examine what characteristics are influencing that performance and identify performance that is not meeting projected benchmarks.
- **Step 5. Identify Solutions.** Programs plan changes to improve weaknesses through management changes, new classes and resources or staff development opportunities.
- **Step 6. Implement Action Plan.** After identifying solutions, programs must make an action plan by evaluating the effectiveness of suggested strategies and disseminate promising practices.
- **Step 7. Measure Benchmark Improvement.** One must then measure benchmarks after an appropriate time frame and examine whether program improvement is the result of the implemented action plan.

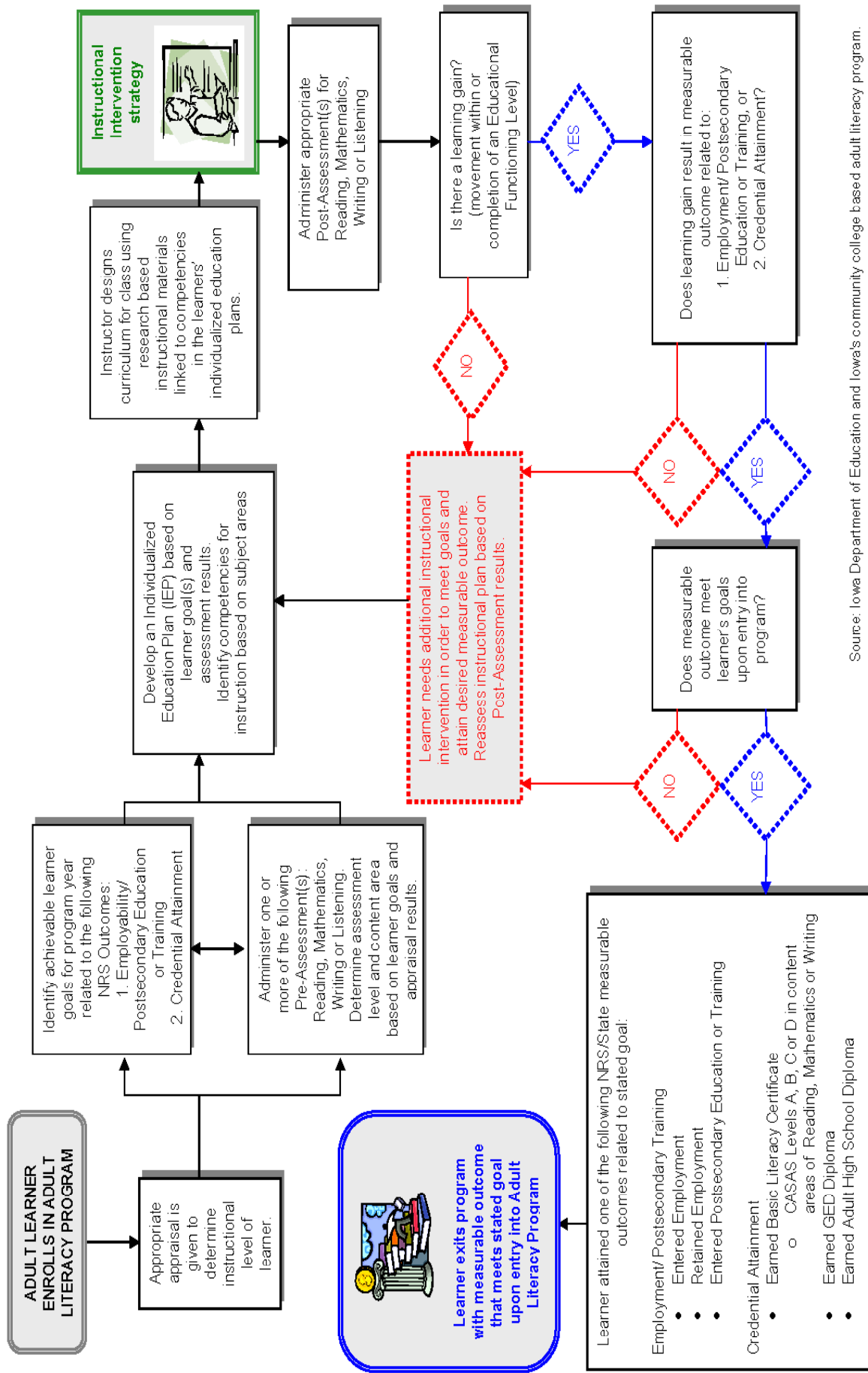
To help local programs identify areas in need of improvement, the state has also developed a flow chart of program operations, student “success” and resulting data. Programs can use the chart, shown in Exhibit 4.7, as they work through the steps of the model, to identify weaknesses and strengths, plan solutions and implement an action plan. Local programs are receiving training on the model and assistance from the state as they begin to use it in the current program year.

Idaho

Idaho has an explicit focus on program improvement, through a multi-year effort begun with its participation in the Northwest Consortium project. At the first meeting two years ago, programs received a flow model of program operations and then worked with their local staffs to develop a profile of their program and a model for analyzing how their program works. Based on the analysis, two programs identified areas for change, implemented the change and then evaluated its impact with data.

This year, the state included all local providers in the process. At a week-long conference, local providers again reviewed the model and then developed an action plan that identified the change to be made, an implementation plan and an approach toward examining their data after an appropriate time frame to determine the effect of the change. To sustain these efforts, programs are provided funding to offset technology, staffing, or implementation costs. In addition to financial support, programs have access to technical assistance provided by state staff and independent consultants.

Exhibit 4.7 Flowchart Depicting Learner Progress Through an Adult Literacy Program



Source: Iowa Department of Education and Iowa's community college based adult literacy program.

One approach several programs are trying is to improve the GED passing rate among low ASE students. One program, for example, decided to try a “fast track” approach. Classes in this track are teacher led, intensive, and last 10 weeks. Students receive special help with writing, which has been an area of poor performance on the GED test, and are “guaranteed” a GED credential if they stick with the course. This approach is compared with a “slow track” that emphasized reading, was more individual-based, and lab style. Their findings were that the “fast track” was more successful in both retaining students and in improving GED passage.

Another program wants to increase their rate of post-testing. By closely examining how students spend their time in the program, and identifying specific ways to encourage students to remain in the program, the program hopes to increase both retention and post-testing numbers.

Massachusetts

Massachusetts has invested considerable resources to develop an Internet-based student record system for the state, known as SMARTT. Local programs enter their data into SMARTT monthly via the Internet to the state server, so that current data are always available for every program. Every program has a state monitor who checks the data and provides assistance as needed. SMARTT also includes a reporting tool, Cognos, that allows all programs access to data at all times.

Using Cognos, program staff can review NRS tables, other state reports and create their own *ad hoc* reports. These reports can be printed for the state overall and by program. In addition, programs can view their own data through state-developed reporting modules (known as cubes) by class, funding source, site and state totals. The system contains five years of data allowing for trend analyses. Exhibit 4.8 shows an example of a local program enrollment report generated through Cognos. The report shows the program’s enrollment by student ethnicity and sex for 1999-2002, along with contact hours and GED credential attainment. The state will be developing additional reporting cubes in the future.

Because the state has access to data in “real-time” they are able to work individually with local programs, problem solving or providing technical assistance. The state provides training on using SMARTT and the Cognos system, as well as on using data for program improvement. At these trainings, programs are briefed on any modifications to the system, provided expertise on entering data effectively and accurately, and shown how to better use the data they can access.

The Cognos system provides local programs with a technologically savvy and user-friendly tool for program improvement. The level of state involvement and support further emphasizes the importance of collecting quality data.

**Exhibit 4.8
Sample Program Report From Cognos**

Student Ethnicity		1999	2000	2001	2002
American Indian/ Alaskan Native	Female	1	0	0	0
	Male	0	0	0	1
Asian	Female	10	3	11	7
	Male	6	3	2	2
Black (not Hispanic)	Female	5	3	3	3
	Male	2	2	1	2
Haitian	Female	3	2	5	4
	Male	1	2	4	3
Hispanic	Female	76	80	61	66
	Male	49	74	73	43
Indian Sub-Continent	Female	1	0	0	2
	Male	0	0	0	0
White (not Hispanic)	Female	55	68	94	95
	Male	33	65	80	74
TOTAL STUDENTS SERVED	Female	151	156	174	177
	Male	91	146	160	125
	TOTAL	242	302	334	302
Number of Service Hours Proposed		27,781	26,657	22,188	22656
Actual Student Contact Hours		18,877	14,206	16,801	19234
Number of Students Received Their GED		51	34	46	68

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Websites and Organizations

The Alabama Best Practices Center.
<http://www.bestpracticescenter.org/publ/wte2-3-res.html>

Annenberg Institute for School Reform: A Toolbox for Accountability.
<http://www.annenberginstitute.org/toolbox/index.html>

International Archive of Education Data.

<http://www.icpsr.umich.edu/IAED/>

National Center for Education Statistics.

<http://nces.ed.gov/>

National Education Association: Data-Driven Decision Making.

<http://www.nea.org/issues/high-stakes/dddm.html>

U.S. Education Statistics: A Research Guide.

http://docs.lib.duke.edu/federal/guides/ed_stats.html

Center for Accountability Solutions: Data Driven Decision Making.

<http://www.aasa.org/cas>

Glossary

Advancement	Learner advanced from one educational functioning level to the next, based on the learner’s performance.
Aggregation, or Data aggregation	The process of combining reports from one level of administration into a single report at the next (e.g., combining local program reports into one statewide report).
Alternative assessment	Procedures and techniques used as an alternative to traditional testing. The focus tends to be on individual student growth over time, rather than comparing students with one another.
Assessment	Methods of measuring student progress, including standardized testing, teacher judgment, and student reports.
Class level	The educational functioning level in which students are placed.
Contact hours	Hours of instruction or instructional activity the learner receives from the program. Instructional activity includes any program-sponsored activity designed to promote student learning in the program curriculum such as classroom instruction, assessment, tutoring, or participation in a learning lab.
Data forms	A written or electronic document for collecting student information.
Data items	Individual questions or pieces of information contained on data forms.
Descriptive measures	For the purposes of the NRS, descriptive measures may include student: demographics, educational status, and goals
Earn a high school diploma or achieve a GED certificate	Obtaining a state accredited secondary diploma or passing the General Educational Development (GED) Tests.
Educational gain	Learner completes or advances one or more educational functioning levels from starting level measured on entry into the programs.
Employed	Learners who work as paid employees, work in their own business or farm, or who work 15 hours or more per week as unpaid workers on a farm or in a business operated by a member of the family. Also included are learners who are not currently working, but who have jobs or businesses from which they are temporarily absent.
English as a Second Language programs	Programs for limited English proficient students have a focus on improving English communication skills such as speaking, reading, writing, and listening.
Enters employment	The learner obtains full- or part-time paid employment before the end of the first quarter after the program exit quarter.
Enters other education or training program	The learner enters another education or training program, such as community college, trade school, a four-year college or university, etc.
Family literacy programs	A program with a literacy component for parents and children or other intergenerational literacy components.
GED	Certificate given to learners who attain passing scores on the General Educational Development (GED) Tests.

Generalizable	The extent to which findings can be generalized to other populations or situations.
Goals	Information collected at intake about the main reasons that a student enrolled in the adult education program.
Improved employment	The learner maintains his or her current employment, but receives an increase in pay, responsibility, or improved job-related skills.
Level benchmarks	Guidelines for placing students in educational functioning levels, based on performance on standardized tests.
Mandatory program	A local, state, or federal program that requires a student to attend adult education classes, for example welfare, NAFTA, or probation.
Mandatory students	Students who are required to attend adult education classes because of their participation in some other local, state, or federal program, including welfare, NAFTA, job training, or probation. Mandatory students do not include students required to attend classes by their employer.
Mean	The arithmetic average of a set of scores, or the sum of observations divided by the number of observations.
Median	The middle score of a set of scores.
Mode	The most frequently occurring score in a set of scores.
NAFTA program	A federal program to assist workers displaced by the North American Free Trade Agreement (NAFTA).
Norm-referenced tests	Tests on which the performance is interpreted in the context of the performance of a group with whom it is reasonable to compare the individual.
Outcome measures	For the purposes of the NRS, core and secondary outcomes of adult education include learning gains, advancement to further education and training, credentials obtained, employment, family, and community measures.
Performance standards	Numeric levels established for outcome measures in the state plan indicating what proportion of students at each level will achieve each outcome.
Post-test	A test administered to a student at regular intervals during a program. It is usually used to measure advancement in the program.
Pre-test	A test administered to a student upon entry into a program. It is usually used for initial placement.
Probation	A situation in which a student is under the supervision of a court and may be required to attend classes.
Program (or program area)	The main emphasis of instruction for a set of classes. Examples of program areas are ABE, GED, workplace literacy, ESL, family literacy, etc.).
Qualitative data	Detailed data collected in the form of words or images that is analyzed for description and themes.
Quantitative data	Data used to describe trends and relationships among variables. Analysis of the data entails the use of statistics.

Range	A measure of variability, computed as the difference between the highest and lowest score in a distribution.
Reliability	The extent to which others would arrive at similar results if they studied the same case using the same procedures; evidence of consistency of a measure.
Researchable question	A question guiding a study should be related to the purpose of the study and be a question that can realistically be answered.
Retain employment	The learner remains employed in the third quarter after the exit quarter.
Specific academic goal	A student goal in which the student desires to learn a specific academic skill not covered by any of the other goal categories (e.g., multiplication, fractions, grammar, etc.).
Standard, (as in procedures, guidelines, and definitions)	All states use the same definitions and coding categories for every data element in the NRS. States follow the same step-by-step instructions on how and when to collect each data element.
Standard deviation	A measure of the variability or spread of scores; the square root of the average of the squared deviations of the scores from the mean of the set of scores.
Student performance	Student attainment formally measured by some assessment method.
Student record system	A computerized or paper-based system for keeping track of student attendance, intake information, achievement, and outcomes.
Student retention	Student attendance long enough and duration so as to show learning gains.
TANF	Temporary Assistance for Needy Families. A federal welfare program.
Uniform system for collecting measures	All states and programs use the same methodology for collecting data on the measures.
Validity	The extent to which a research instrument measures what it purports to measure.
Variance	A measure of the variability of the scores in a frequency distribution; more specifically, the square of its <i>standard deviation</i> .
Voluntary students	Students who attend adult education classes of their own free will; they are not required to attend by any state agency.
Work-based project learner activity	A short-term course (at least 12 hours and no more than 30 hours) in which instruction is designed to teach work-based skills and in which the educational outcomes and standards for achievement are specified.
Workplace literacy programs	A program designed to improve the literacy skills needed to perform a job and at least partly under the auspices of an employer.