(PART I OF II)

Using Data for Program Improvement

Reading Data Charts and Tables

WHY USE DATA? HOW IS IT USEFUL FOR RUNNING PROGRAMS?

It takes some program resources to collect and analyze data, but the return on investment can be large. Program administrators and staff can use evaluation data to:

- Keep staff focused on results you want to achieve

- Test assumptions about how effectively program activities achieve the intended results

- Decide how to improve the program

- Identify activities that bring the biggest return on investment

- Promote visibility and community support for the program

In the next two briefs, we will explain some of the key data available from the evaluation of the Michigan 21st Century Community Learning Centers (21st CCLC) program, how to read and interpret data presented in various formats, and how to use the information to improve and sustain your program. In this brief, we define basic evaluation terms and show you how to read data presented in different types of charts and tables. In our next brief, we will discuss how to interpret the data, explain your results, and use data in program planning.

DEFINING TERMS

Before we begin, let's define some of the terms used in discussing evaluation data. We present these terms in the order in which you would logically think about them when developing an evaluation plan.

Participant characteristics: Characteristics of youth that may influence their likelihood of benefiting from the program (for example, age, gender, ethnicity, previous academic performance)

Activities: What the program does to bring about the desired outcomes (for example, classes, field trips, outreach efforts, community education, professional development workshops)

Outputs: Direct products of program activities (for example, the number of sessions held, number of students attending a session)

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Outcomes: Benefits to participants from participating in the program, which can be:

- **Initial:** New knowledge, skills, attitudes, or beliefs (for example, what students learn from different sessions, changes in student attitudes about the importance of school, staff skills gained from professional development)

- **Intermediate:** New behaviors or practices of participants or staff (for example, students complete more homework or attend school more regularly, staff handle discipline better)

- **Long term:** Changes in the status of participants (for example, better academic performance, better adjustment to school)

Indicators: Measures of progress toward a desired result or outcome (for example, students improve at least ½ grade [e.g., C to C+] from fall to spring)

Targets: Goals for performance on a particular indicator set by you or your funding source (for example, 45% of students will improve in reading grades)

Benchmark: A standard set by existing best practice (for example, school standards for measuring academic performance at different grade levels)

READING DATA CHARTS AND TABLES

A Note about Samples

"You don't have to eat the whole ox to know the meat is tough."

This quote, attributed to Samuel Johnson, is used frequently by statisticians to illustrate the notion behind sampling. To get information about a whole group of people—the population—we don't have to survey everyone. We can get reasonably accurate information about the whole population by surveying a portion of the group—a sample. However, to be accurate, samples must be scientifically drawn. Since the samples in the afterschool programs are not scientifically drawn (because students and families decide to come on their own and are not randomly assigned), the results should be interpreted with caution.

Here are two dangers in assuming that the responses of a few people represent the whole group:

- **Sample bias:** Since those who answered the surveys agreed to participate or were those who showed up on a particular day, they may not be representative of the whole group. People who answered the survey may have been motivated to respond because they felt particularly positive or negative about the program, or they may have been available to answer the survey on the day it was given because they came to the program more often.

- **Sample size (N):** Accuracy of the results depends on having a sample of a certain size. If your sample is very small—for example, 10 students out of 100 students served—it may not represent the whole group and the responses of just one or two people will greatly affect the results.

These dangers are why we encourage you to turn in as much data as possible; we want the results to be a good representation of your program.

> A very small sample—for example, 10 students out of 100 students served—may not represent the whole group.

Types of Charts and Tables Used in Evaluation Reports of the Michigan 21st CCLC State Evaluation

From 2004-2005 to 2006-2007, the annual evaluation report to the state included analyses of implementation issues such as management practices, school relationships and community partnerships in addition to information about student participation and outcomes. Upon the request of the MDE consultants, the annual report for 2007-2008 will focus on Michigan's status in regard to federal performance targets, student participation, and parent/student satisfaction. The evaluators will continue to provide Annual Report Forms (ARF) for all the individual grantees that present data from their own programs. In this brief, we discuss the types of tables and charts that will be found in these two reports. These types of charts and tables can also be found in many other reports.

Generally, state evaluation data are presented in four different types of charts:

Bar charts are used to display distributions of data in categories (for example, the number of boys and girls who participated in the program, percent of students who participated in each different type of activity). Bar charts can display data as single bars or in more complicated versions that compare data for different groups.

- **Paired bar charts** are used to compare two or more different groups on some characteristic or outcome (for example, MEAP scores for elementary vs. middle school students).

- **Stacked bar charts** are used to compare the parts to the whole. A stacked bar shows the percent within each category that fit a certain subcategory (for example, percent of participants in certain groups who attended more than 30 days or less than 30 days).

Pie charts are used to show data about the distribution of a particular indicator (for example, percent of parents who graded the program A, B, C, D, or F).

Trend lines are used to give a picture of change over time in a given indicator (for example, percent of participants who improved in reading or math grades each year over a 3-year period).

Tables are a simple way to present data, and in fact most data in the Annual Report Form are presented in this way. Tables can display data about many factors, such as program participation and retention, outcome indicators, participant characteristics, or program characteristics. You can use tables to compare data for each indicator over several years or for different groups. The same data can also be displayed in a chart, but it might be too complicated to read easily or you may not have the capacity to generate charts.

Let's review each type of chart with some examples.
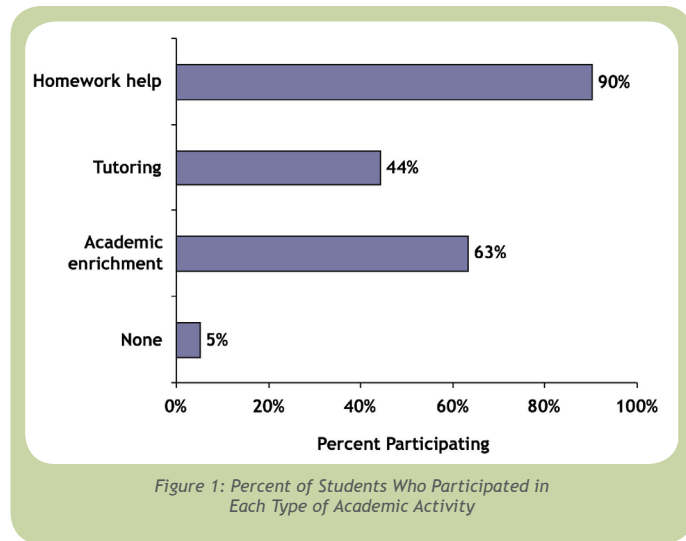
Bar Charts

Single Bar Charts

Single bars are used to compare different categories or different groups. The percentages in the chart do not have to add up to 100%. Column charts, in
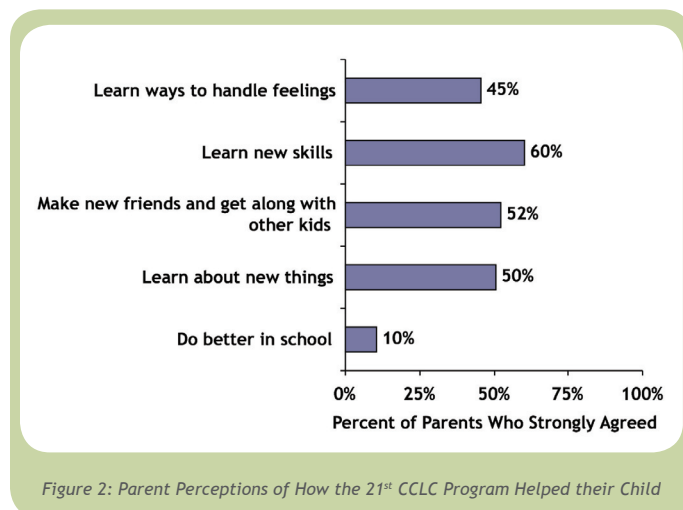
which the bars are vertical rather than horizontal, are just bar charts in a different format.

Figure 1 is a bar chart that shows the percent of students who participated in different types of academic activities across the state. You can see that the largest percentage of students participated in homework help, and about two thirds were involved in academic enrichment activities. However, 5% did not participate in any academic activities.


Figure 1: Percent of Students Who Participated in Each Type of Academic Activity

Figure 2 shows a bar chart that displays parent perceptions of how the program helped their children. Each bar represents the percent of parents who strongly agreed with each statement. As you can see, the largest percent of parents (60%) thought that the program helped their children learn new skills, and the smallest percent (10%) thought the program helped them do better in school. About half believed that the program helped their children handle feelings, improve peer interactions, and learn about new things. Remember, the data in this chart only include parents who completed the survey. You need to consider whether the parents who completed the survey are different, and might have different perceptions about the program, compared to parents who did not complete the survey.

Are people who completed surveys different from people who did not complete surveys? This affects how you interpret the results.

Figure 2: Parent Perceptions of How the 21st CCLC Program Helped their Child

Paired Bar Charts

Paired bar or column charts allow you to compare different groups on some factor. The percentages in paired bar charts do not have to add up to 100% because you are comparing different groups. For example, Figure 3 shows the percent of elementary and secondary school students who improved their MEAP scores in reading and math. As you can see, the percent of elementary and secondary school students who improved in reading is about the same, but a larger percent of secondary school students improved in math compared to elementary school students.

Figure 3: Percent of Elementary and Middle School Students Who Improved MEAP Scores
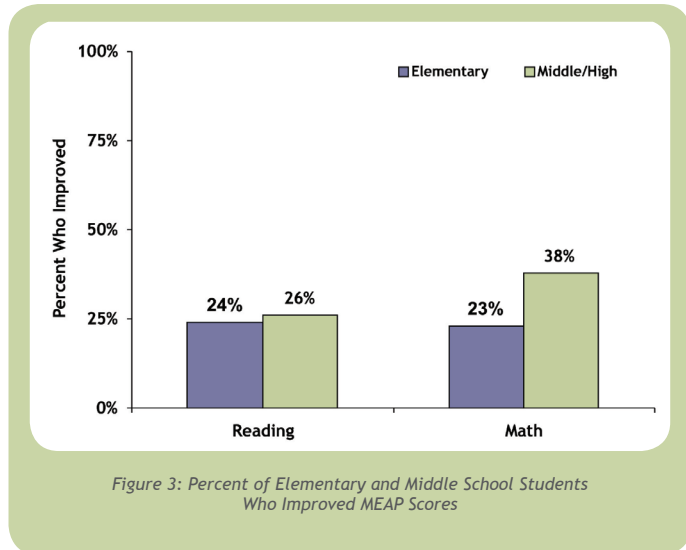
Stacked Bar Charts

Stacked bar charts are used to compare parts of a specific category to the whole. Each bar shows the percent in a specific subcategory compared to the entire category. Thus, the percents for the subcategories in each bar must add up to 100%. For example, this type of chart can be used to compare the percent of students enrolled in the program who attended less than 30 days to the percent who attended more regularly. If you include several sets of stacked bars in the chart, you can compare trends over time.

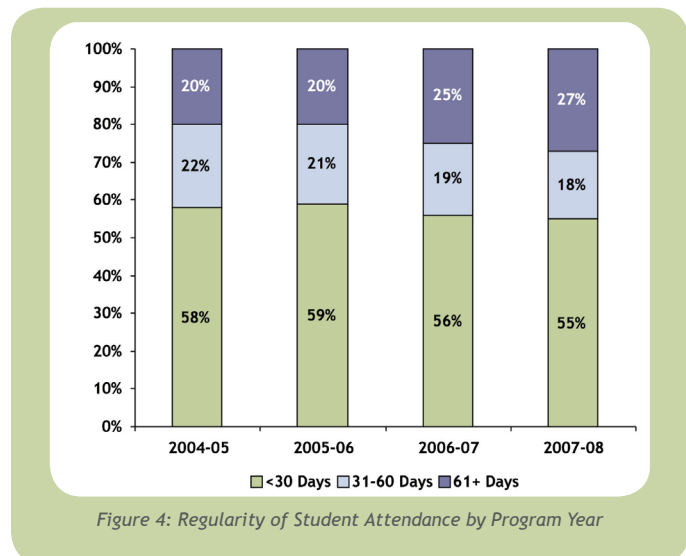*Figure 4: Regularity of Student Attendance by Program Year*

Figure 4 is an example of a chart showing program attendance over a 4-year period. For each year, the chart shows the percent of students who attended less than 30 days, 31-60 days, or more than 60 days. As you can see, the percent of students who attended less than 30 days was pretty stable for the first two years but decreased slightly in the last two years. At the same time, the percent of students attending more than 60 days increased a few points, indicating that retention improved somewhat. As a rule of thumb, we will consider a change of 5% to be meaningful.

Pie Charts

Since pie charts display the distribution of some outcome or characteristic of the group, all the slices together must add up to 100%. Each "slice" represents a percent of the total distribution. For example, Figure 5 shows the percent of parents who gave their child's program a grade of A, B, C, D, or F. As you can see, in this example the majority of parents gave their child's afterschool program a grade of A or B, and no parents gave the program a grade of F.
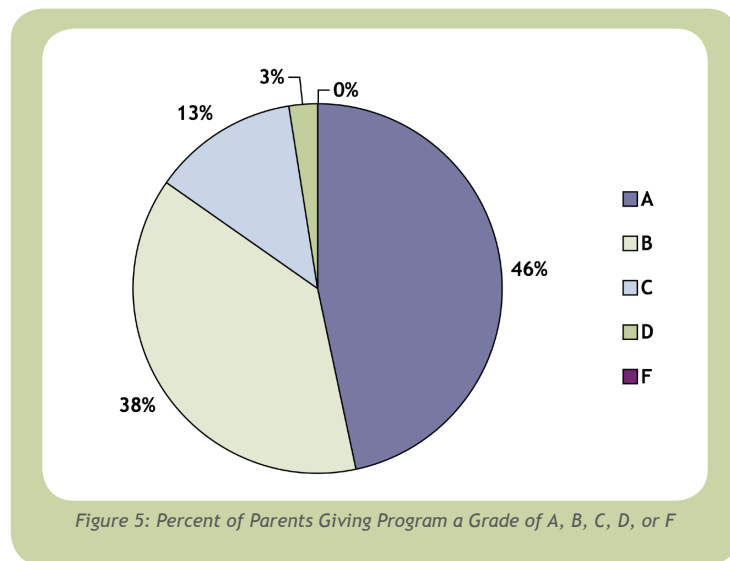

Figure 5: Percent of Parents Giving Program a Grade of A, B, C, D, or F

Trend Lines

Trend lines allow you to see how an indicator changes over time because they display several measurements of the same indicator at different points in time. To read a trend line, you follow the line from left to right, because the earliest time is at the far left.

- A line going up indicates the indicator is increasing

- A line going down indicates the indicator is decreasing

- A horizontal line indicates the indicator is unchanged

- A line that bounces up and down indicates the indicator is unstable

By plotting different trend lines on the same chart, you can show changes in different indicators (for example, reading and math grades), or show changes on the same indicator for different groups (for example, students in the state vs. students in the U.S.).

Figure 6 shows changes in elementary and middle school students' math grades over a 4-year period. One line shows the percent of elementary school students who improved and the other line shows the percent of middle school students who improved. As you can see, the percent of elementary school students whose math grades improved increased slightly over the 3-year period. However, the percent of middle school students who improved went up and down, indicating no clear trend.
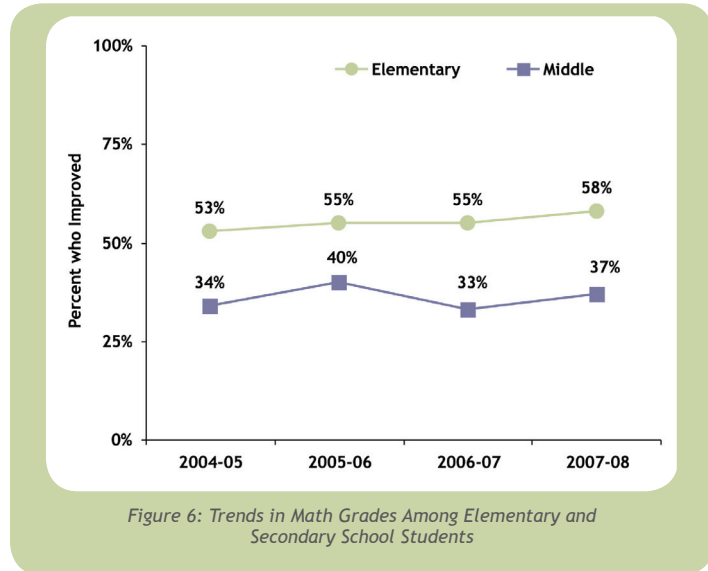

Figure 6: Trends in Math Grades Among Elementary and Secondary School Students

Data Tables

Sometimes it is easiest to display data in a table. Tables can be used to present frequencies (actual numbers) or percents of those who gave each response. Table 1 displays information about enrollment and attendance in both the summer and school-year programs for a specific site over two program years. Enrollment and average daily attendance are actual numbers of students, but the proportion of students attending regularly out of all the students enrolled is displayed as a percent. As you can see, for this site the number of students enrolled and the average number attending each day increased in both summer and school-year programs, but the percent of students who attended regularly decreased slightly.

Table 1: Overall Attendance in Summer and School-year Programs, 2006-2007 & 2007-2008

Item	2006-07	2007-08
Enrollment, summer	123	157
Enrollment, school year	245	260
Average daily attendance, summer	60	63
Average daily attendance, school year	178	190
Percent of enrolled students who attended at least 30 days during the year	52%	48%

Table 2 compares the academic improvement of students in a single site with the performance of students statewide. The table displays the percent of students who improved their grades in reading and math for two groups—all students attending and only those who had room for improvement (i.e., with initial grade point averages of 3.0 or less). As you can see, Site A is doing better than the state overall in the percent of all students who improved. Among students with room for improvement, Site A is doing better than the state in reading but worse than the state in math.

Table 2: Percent of Students Whose Grades Improved: Individual Site Compared to State

Subject area and student group	Site A	State
Reading (all students)	45%	37%
Math (all students)	46%	41%
Reading (only students with room for improvement*)	49%	44%
Math (only students with room for improvement*)	48%	53%

*Room for improvement is defined as having an initial grade point average of 3.0 or less

SUMMARY

In Part I of *Using Data*, we have talked about ways to use evaluation data to help your program, defined some common terms used in evaluation, and discussed how to read data presented in charts and tables. In Part II, we will discuss how to interpret the data, explain your findings, and use this information for planning and program improvement.

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