Data Collection

Definition

Data collection is collecting specific information about a student's academic or behavioral performance. Collecting data helps an instructor determine a program's effectiveness. By collecting and analyzing data on a systematic basis, an instructor knows when to make changes in both academic and behavior programs.

Data collection has two critical components: information gathering and decision making. Information gathering may involve curriculum-based assessment, observing classroom behavior, grading papers, or parent interviews. The more structured and systematic the process, the more valid the information. Once the data is collected, the instructor must then make decisions based on that information. Decisions might be made regarding changes in curriculum or the management of specific classroom behaviors.

Things to Do

✓ Select the behavior.

✓ Define the target behavior(s).

✓ Choose a data collection system.

✓ Determine when to collect data.

✓ Implement the data collection system.

✓ Summarize and graph data.

✓ Utilize data to make decisions about program effectiveness.

☑ Select the behavior.

It is always important to pinpoint or specify the target behavior before initiating a behavior change or academic program for a student. Data is typically collected on the following types of behavior: academic, classroom, work-related, or social. When selecting the behavior, it is important to use **descriptive** rather than **ambiguous** terms. For example, "causes problems" tells less about a student's behavior than "does not follow directions." Likewise, "lazy" is less informative than "does not complete assignments on time."

Reduce Problematic Behaviors

Most parents and instructors can identify a number of behaviors that they would like to see **reduced**. In general, they include such problem behaviors as noncompliance, off-task behavior, talking out, or aggression.

Replace Problematic Behaviors

Remember, when targeting behavior that is problematic, it is equally important to identify the appropriate skill(s) that would **replace** the problem behavior. For example, a *replacement* behavior for "noncompliance" might be "following instructor's directions within 5 to 10 seconds." Similarly, a replacement behavior for "interrupts adults and peers" might be "waits turn to speak when others are talking."

☑ Define the target behavior(s).

After selecting the behaviors, the instructor must specifically define the target behaviors in "observable and measurable" terms. Observable and measurable refers to behaviors that are easily observed, countable, have a beginning and an end, and are repeatable. For example, the behavior "talking out" might be defined as "when the teacher asks the class a question, the student speaks without raising her hand or waiting to be called upon." A precise definition pinpoints *when* and under *what* conditions the behavior must occur.
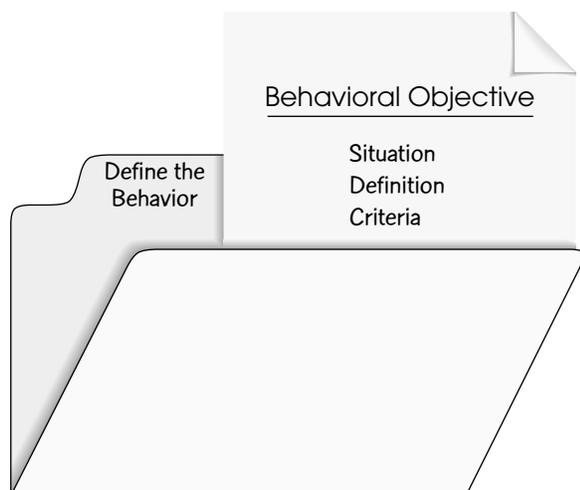
Define the Behavior

Observable & Measurable

- Easily observed
- Countable
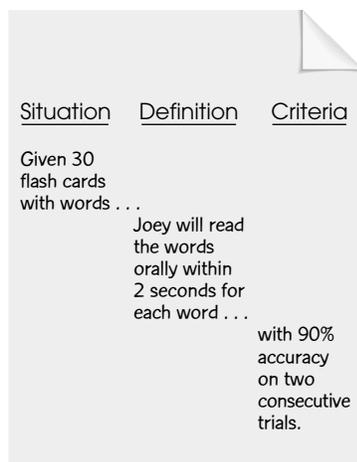- Beginning/end
- Repeatable

Behavioral Objective

Once the behavior has been defined, create a related behavioral objective. That is, determine what the student should accomplish as a result of the instructional or behavioral program.

Behavioral Objective
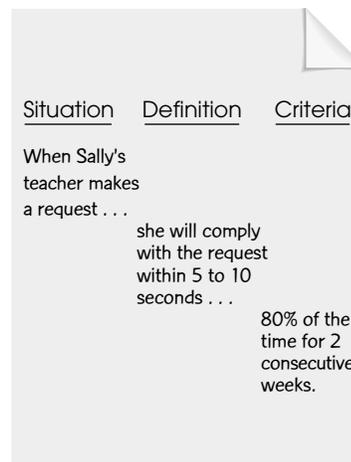
Situation
Definition
Criteria

Define the
Behavior

The objective should have three parts:

1. The situation or conditions under which the behavior is expected to occur.

2. The behavioral pinpoint or definition.

3. The criteria for acceptable performance.

An academic objective might address basic reading skills in the following way.

A behavioral objective for social skills might state the following.

Situation	Definition	Criteria
Given 30 flash cards with words . . .	Joey will read the words orally within 2 seconds for each word . . .	with 90% accuracy on two consecutive trials.

Situation	Definition	Criteria
When Sally's teacher makes a request . . .	she will comply with the request within 5 to 10 seconds . . .	80% of the time for 2 consecutive weeks.

☑ **Choose a data collection system.**

Typically, instructors use a variety of assessment techniques. Those most commonly used include:

✎ Collecting academic performance information (permanent product).

✎ Using behavior checklists.

✎ Interviewing others.

✎ Observing students in classrooms, work sites, lunch, break, or recess activities.

Choose a Data
Collection
System

Types of Data

P Permanent products
P Behavior checklists
P Interviews
P Observations
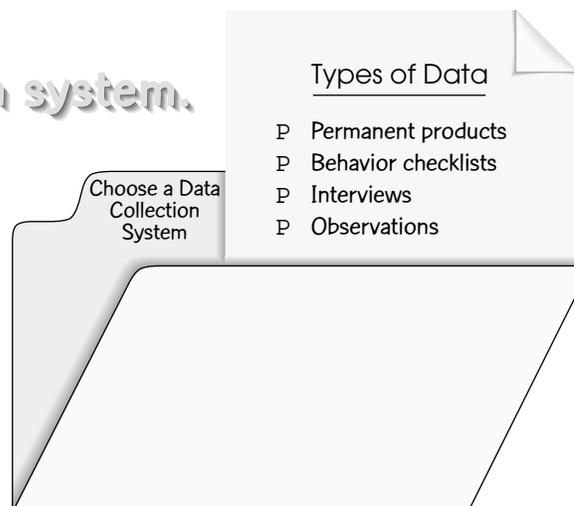
Behavior Problem Checklists

Checklists are lists of specific behaviors completed by persons familiar with the student. They are popular among instructors because they are easy to use and can be helpful in identifying the severity of the behavior problem. But be aware that many checklist items are vague and open to interpretation. Also, many individuals relying on their memory complete checklists after the fact, resulting in questionable or biased data.

Behavioral Interviews

Interviews involve asking someone information about a subject. They can be conducted with both children and adults. This assessment technique helps establish a relationship with the person giving the information. Interviews are often open-ended, allowing the interviewer to gather additional information as needed.

Permanent Products

These products are outcomes of behavior and may be tangible items, such as worksheets or mastery tests. They may also be environmental outcomes, such as a driveway that has been swept clean. Permanent products have been used by instructors to grade spelling tests, check arithmetic problems, or count the number of wooden stakes painted by a student.

Observations

Whereas the permanent product method of data collection records the outcome of a behavior, observational recording systems are used to record samples of behavior as they are occurring. There are several basic systems for recording observational data. Each system has strengths and weaknesses that lend itself to particular behaviors and their unique characteristics.

✍ **Event Recording**

Event or frequency recording is used by instructors who are interested in counting the number of times a behavior occurs. A tally is made each time the student engages in the target behavior. This count is made within a specified time, such as a 30-minute math session.

Event

1 ||	2 ◯	3 |	4 |||	5 ||
6 卌|	7 |	8 |||	9 ◯	10 ||||

30-minute math session

Observational Systems

Observations

Event
Interval/Time Sampling
Duration
Latency

Event recording is usually the method of choice when the teacher wants to **increase** or **decrease** a behavior. To use event recording, the behavior must be observable and have a clear beginning as well as a clear ending.

Strengths

Only need a clipboard, pencil, and paper or a counting device.

Weaknesses

Do not use under the following conditions:

☞ When the behavior is occurring at such a **high rate** that an accurate count is impossible, such as pencil tapping.

☞ When the behavior occurs for extended periods of time, such as out-of-seat behavior.

☞ **Interval Recording**

Interval recording and time sampling are best used for behaviors that appear continuous, such as talking with peers or on-task behavior. Interval recording provides an **estimate** of the actual number of times that a behavior occurs.

To use interval recording, break the observation period into short intervals of time—usually from 10 seconds to 1 minute. Then simply note whether the behavior occurred (+) or did not occur (–) during the interval. **_Keep in mind that data from interval recording represents an "estimate" of behavior rather than an actual count_**.

Interval

10	20	30	40	50	60	1 min.
+	–	+	+	–	+	
10	20	30	40	50	60	2 min.

On-task
4 out of 6 intervals

Strengths

Regardless of whether the behavior occurs once, twice, or five times, it is checked only **once** to indicate that it occurred during the interval.

Weaknesses

It's difficult to teach **and** collect accurate data at the same time. The necessity of looking down at a stopwatch or data sheet to record the information can be disruptive to any lesson. Often an observer is required.

However, a cassette recorder and a "beep" tape, signaling at regular intervals, can eliminate timing issues. Or use an interval form that incorporates a recording interlude following each interval.

Interval
(with 5-second record)

10"	5"	10"	5"	10"	5"	10"	5"
+		+		–		+	

Observe / Score Observe / Score Observe / Score Observe / Score

☞ Time Sampling

Time sampling is a variation of interval recording. Intervals of a certain length are set up usually in minutes as opposed to seconds. Instead of noting the occurrence or nonoccurrence of a behavior throughout the **entire** interval, the observer looks at the student at only the end of the interval and records whether the behavior is occurring at that instant.

Time Sampling

| 1	2	3	4	5	6	6 min.
7	8	9	10	11	12	12 min.

Strengths

Requires less work and is effective when the instructor is interested in group performance.

Weaknesses

Is less accurate than interval recording.

☞ Duration Recording

Use this method when your primary concern is the **length of time** the student engages in the behavior. For example, if you want to know about a student's out-of-seat behavior, event or duration recording may work.
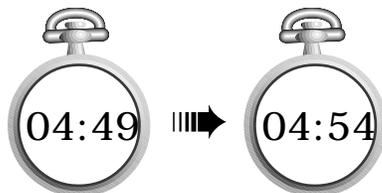
04:49 ⏩ 04:54   To record duration data, start the stopwatch when the student begins the behavior and stop the watch when the behavior is completed.

Strengths

Event recording tells only **how many** times the student is out of his/her seat during a time period. Duration recording tells **how many times *plus* how long** the student is out of his/her seat.

Weaknesses

As with event recording, the behaviors measured must have a clear beginning and an end and not occur too frequently.

☞ Latency Recording

Focuses on time rather than frequency. Use latency recording when you're interested in how long a student takes to **begin** performing a particular behavior once it has been requested.

To record latency data, note when you **give** the student a directive and when the student **begins** the response.

Latency Recording

Observer Douglas   **Date** Oct. 11

Student Joey   **Session** Math

Target Behavior Start assignments on time

Direction:	Start:	Stop:
1:05	1:10	1:25

☑ Determine when to collect data.

Identify times to collect data through-out the day or week. These times will vary depending on what target be-haviors are selected, how frequently they occur, and available resources. For example, a teacher interested in collecting data on math performance may collect information during (e.g., rate) and after (e.g., assignments completed) a math session. Social behaviors may be more readily as-sessed during unstructured times such as break, recess, or lunch.

Daily Schedule
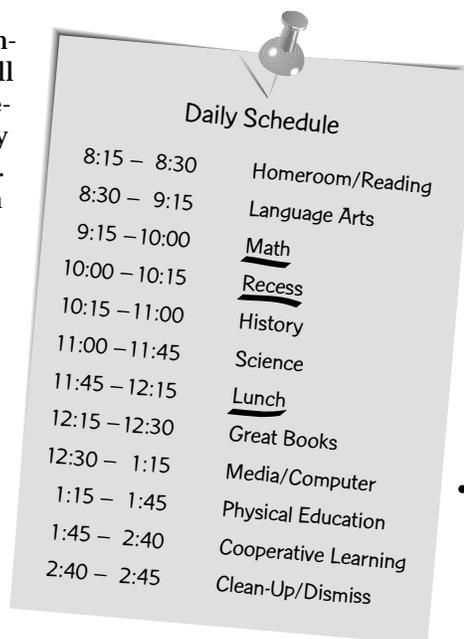
8:15 – 8:30	Homeroom/Reading
8:30 – 9:15	Language Arts
9:15 – 10:00	Math
10:00 – 10:15	Recess
10:15 – 11:00	History
11:00 – 11:45	Science
11:45 – 12:15	Lunch
12:15 – 12:30	Great Books
12:30 – 1:15	Media/Computer
1:15 – 1:45	Physical Education
1:45 – 2:40	Cooperative Learning
2:40 – 2:45	Clean-Up/Dismiss

- Target behavior

- Frequency

- Available resources

☑ Implement the data collection system.

Once the times for data collection have been established, it is impor-tant to stick to your schedule. If data are to be representative of a student's performance, it must be collected on a consistent basis over time. Only then can the effects of program changes or interventions on a student's behavior be determined.

STicK To iT!

Use Correct or Reliable Data

To be sure the data are **correct** or **reliable**, it is wise to periodically have a second observer simul-taneously record the *same* behavior of the *same* student at the *same* time. When this is done, the two observations can be compared and *interobserver* reliability or agreement calculated.

Adjust the data collection system and behavioral definition as needed to ensure valid and reliable information is being collected and communicated with others. [See Alberto and Troutman (1995) for a "user friendly" discussion on critical reliability issues and procedures for instructors.]

☑ Summarize and graph data.

To be useful, information gathered through data collection must be easily readable. Tallies or other forms of raw data are difficult to interpret, especially when more than one individual is sharing the information. Graphing data provides an easy, systematic way of displaying information about the target behavior.

Graphing is a two-step process. First, raw data must be converted to a usable form, such as percentages, number correct, or a rate.

Percentage

For example, to calculate a **percentage** of correct responses, divide the number of correct responses by the total number of responses and multiply by 100.

Percent Correct

$$\frac{\text{\# correct responses}}{\text{Total \# of responses}} \times 100 =$$

- - - - - - - - - Example - - - - - - - - -

$$\frac{20 \text{ math problems}}{40 \text{ possible}} \times 100 = 50\% \text{ correct}$$

Summarize & Graph Data

Rate

A **rate** of correct responding is computed by dividing the number correct by the response time.

Rate

$$\frac{\text{\# correct responses}}{\text{Response time}} =$$

- - - - - - - - - Example - - - - - - - - -

$$\frac{20 \text{ correct}}{30 \text{ minutes}} = .7 \text{ problems correct/minute}$$

Summarize & Graph Data

Graphs

There are several types of graphs that can be used. These include:

☞ Basic line graph

☞ Cumulative graph

☞ Ratio graph

☞ Bar graph

The most frequently used tool for displaying data is the basic line graph. The line graph includes two axes, the horizontal or *x*-axis and the vertical or *y*-axis. The axes are labeled with the time dimension (e.g., session, day, hour) placed on the *x*-axis and the description of behavior (e.g., talk-outs, contributions, praise statements) placed on the *y*-axis. Each data point is placed at the intersection of the session in which it occurred and the level of behavior.

Line Graph
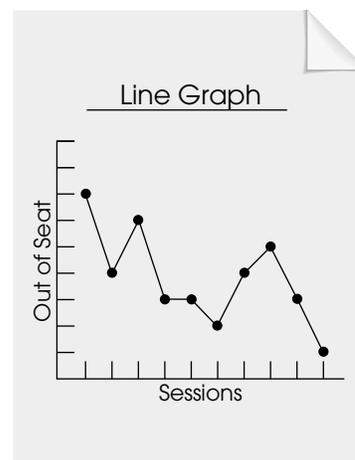
✔ **Utilize data to make decisions about program effectiveness.**

To provide valid and reliable information regarding a student's performance, data collection must be a continuous, ongoing process. To determine if a program has been effective, it helps to evaluate trends in performance by focusing on systematic and consistent **increases** or **decreases** in performance. Trends are defined as 3 or more data points in the same direction. Trends in data indicate the effectiveness of programs and assist instructors in determining the need for program changes.

Trends
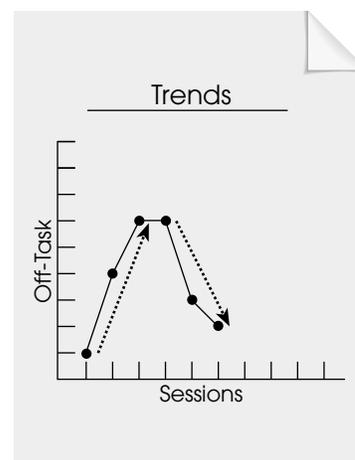
Variations of the Technique

✎ **Public posting** or advertising for success is a highly effective intervention that may be used by instructors to enhance student motivation and decrease inappropriate behaviors. Public posting is a form of data collection and provides immediate and precise information to students regarding their academic or behavioral progress. Public posting requires a visual feedback system, a systematic method for gathering and displaying relevant performance data, and an engineered positive reaction to the student's performance. [For implementation details, see *BEST Practices: Behavioral and Educational Strategies for Teachers* (1996).]

✎ **Functional analysis** is a multifaceted form of data collection. This comprehensive process assesses behavior as it varies within the environment. Functional analysis is often referred to as the A, B, C (A = Antecedent, B = Behavior, C = Consequence) function of behavior and examines the impact of antecedents or circumstances (e.g., events, individuals) and consequences (e.g., reinforcers, punishers) on the target behavior. (For more specific information, see *Functional Analysis—Preliminary Strategies*.)

✎ **Self-management**, another variation of data collection, teaches students to monitor and evaluate their behavior and provide their own positive and negative consequences. (See *Self-Management—Level 1* for additional information and steps for implementation.)

Getting Ready

✎ Prior to data collection, the instructor should review his/her resources and daily schedule to determine what forms of data collection are feasible. If the instructor works with other staff, more time-consuming forms of data collection are possible. When working alone, the instructor needs to consider what pieces of data are vital and what data systems can be successfully implemented in light of the circumstances.

✎ If the data collected will be used for purposes of classification rather than standard monitoring of academic performance, the instructor must first inform the parent(s) of the intent (prior notice) and obtain his/her signature on an district-approved "Permission to Evaluate" form.

References

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