A Quick Guide to School Safety Data Visualization
The National Center for School Safety (NCSS) is a Bureau of Justice Assistance-funded training and technical assistance center at the University of Michigan School of Public Health. As a multidisciplinary, multi-institutional center focused on improving school safety and preventing school violence, the NCSS team is composed of national leaders in criminal justice, education, social work, and public health with expertise in school safety research and practice. NCSS provides comprehensive and accessible support to Students, Teachers, and Officers Preventing (STOP) School Violence grantees and the school safety community nationwide to address today's school safety challenges. NCSS serves as the national training and technical assistance provider for the STOP School Violence Program.

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Overview
This guide for school boards, school administrators, and principals is intended to provide an overview of key considerations related to visualizing school safety data.

Data visualization is the process of presenting data in a visual form to reveal patterns in the data.¹ It helps people make sense of the information they are being presented with. When done well, it allows them to better understand what the data describes.

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Why Data Visualization Is Important

Collecting data helps schools and school districts develop a project plan that utilizes and produces measurable results. This helps to ensure that decisions are based on complete and unbiased information.

Data serves as:

» The first step toward school improvement
» A method for keeping schools accountable as they work towards school safety goals
» An evidence-based method of identifying school needs
» A reference for policymakers to develop effective programs and policies aimed at school safety
» A basis for grant applications

Data is often used to:

» Identify trends and prioritize concerns
» Determine root causes of safety concerns and safety trends
» Set goals (federal/state/tribal and district expectations)
» Monitor progress towards performance goals
» Monitor implementation of major improvement strategies
» Promote transparency within the organization and community
» Demonstrate effective responsiveness to concerning trends and ensure accountability
» Assess the impact of programs that have been implemented to promote school safety and assess if additional efforts are needed
» Manage available resources and calculate the estimated need for financial and other support
» Promote increased awareness with the goal of mitigating potential tragedies
» Assist schools in making decisions based on evidence-based data
» Allow recognition and celebration of proven successes in the school community, which boosts morale and encourages continued progress
Consider qualitative and quantitative data to understand both the perception of what is happening in addition to what is actually happening at your school and in your community.  

**Questions to Consider when Collecting School Safety Data**

» Is the data being used to achieve a district goal?
» Is collecting data the only way to address the problem?
» Given that it generally can take months to generate, collect, and analyze data, can the district wait? Will the data still be relevant to the question?

**Safety Data Points Often Collected in School Settings**

» Victimization
» Student and staff injury
» Bullying and electronic bullying
» School conditions
» Fights
» Weapons
» Availability and student use of drugs and alcohol
» Student perceptions of personal safety at school
» Criminal incidents
While data provides the opportunity to analyze multiple aspects of school safety, it is important to note that individual data points provide a snapshot—it may be more beneficial and informative to look at trends over time, data by subpopulations, or in comparison to state and national data.[1]

There are many ways to collect school safety data including:[2]

» Surveys and questionnaires
» Interviews or focus groups
» Teacher logs/records
» Observations of actual safety practices (such as drills) and student responses
» Academic assessments (grades, test scores, etc.) before and after school safety incidents
» Locally-developed pretests and posttests during staff safety training
» Qualitative data and feedback

For resources on collecting your own data, refer to the School Climate Survey Compendium. This collection of valid and reliable surveys, assessments, and scales of school climate can assist educators in their efforts to identify and assess their conditions for learning.

To compare your data to existing sources, visit the School Survey on Crime and Safety (SSOCS) developed by the Institute of Education Sciences. It serves as the primary source of school-level data on crime and safety for the U.S. Additionally, you may wish to consult the Institute of Education Sciences’ annual report on the Indicators of School Crime and Safety.

Another resource, the School Crime Supplement (SCS) to the National Crime Victimization Survey (NCVS), is an addendum to a national household survey conducted every two years collecting data on alcohol and drug availability, bullying and cyberbullying, disorder and rule enforcement, extracurricular activities, fear and avoidance behaviors, fights, gangs, graffiti, hate words, school characteristics, school security, school transportation, social bonding, and weapons in school.
How to Interpret the Data You Collect

Before collecting or reviewing data, it is key to establish clear goals for collecting data in the first place. Additionally, the data you collect is only as good as the questions you decide to ask. Being as specific as possible will help ensure that the data can be interpreted accurately.

In general, when you are analyzing data, it is recommended that you:

» Use data from the same sources from year to year
» Collect and analyze as much data as possible
» Use multiple measures
» Always consider the nature, size, and characteristics of the group(s) represented in the data
» Be sure to know what is being measured and on what scale
» Remember that large-scale data may not provide specific detail about individual elements
» Compare data from different groups in addition to looking at overall trends
» Focus on longitudinal data, rather than individual data points

In the context of schools, keep in mind that:

» There is no one-size-fits-all approach to interpreting school safety data
» The data from the majority of students may mask important data from subgroups, so it is important to look deeper than what you see in the general data you collect
» There are limits to data, especially when it comes to the subjective lived experiences of students, staff, and families—there are some things data just cannot represent well

If you have a goal of analyzing the degree to which students, staff, and families feel safe from violence, bullying, harassment, and substance use within the school community, you can use that data to help make decisions about what resources to use and where to focus your efforts. For examples of surveys and school climate data interpretation guides, visit the National Center for Safe Supportive Learning Environments’ School Climate Data Interpretation Resources page.
How to Create Data Visualizations

Data visualization is the creation of a compelling story through the use of graphics, including graphs, charts, and maps, to highlight important characteristics of the data and allow for easier interpretation.\[13\]

The human eye is naturally drawn to colors and patterns, so creating a visual representation of data can allow for quick observation and recognition of patterns, relationships, trends, and outliers.\[14\]

Remember that it is important to confirm trends noted visually with numerical data to ensure data interpretations are accurate.\[15\]

**Data visualization tools include:**\[15\] [16]

- **Bar graphs** to break down information
- **Line graphs** to highlight trends
- **Pie chart** to illustrate part-to-whole relationships (e.g., a very small or very large section of the whole)
- **Scatter plots** to show distribution and relationships
- **Maps** to show the geographical distribution of data
- **Tree plots** to show hierarchical relationships
- **Word clouds** to demonstrate frequency\[14\]
When creating data visualizations, it is important to consider both the goal of the data as well as the intended user. The following are tips to keep in mind when creating data visualizations:

» Keep it simple and concise
» Add white space to ensure the main points are not lost in a crowded graphic
» Use purposeful design principles with a goal in mind
» Focus on these three elements: data, design, and feel
» Make it easy to compare data
» Blend your data sources to create a summary

There are various ways to visualize the same data set. Interpretation plays a big role in what visualization you select, so it is essential to think about the primary meaning of the data so as to not obscure the information being shared.

Each type of data visualization has strengths and weaknesses, depending on the message intended to be communicated. For example, if your intention is to draw attention to the trend of increasing graduation rates, a line graph would be best; conversely, a bar graph makes it easier to compare distinct graduation rates by year. Effective data visualization showcases the appropriate amount of information and visual style for a particular audience.

How to Use Data Visualizations

Collecting and successfully visualizing data should serve as the first step in allocating resources, determining priorities, and guiding decision-making for school safety initiatives. Data can and should be used as a method for growth and improvement. It can help guide decision-making and promote accountability within the organization and to the community. Data evaluation should remain a priority throughout the year, otherwise, it can easily become forgotten or minimized due to other projects.
It is important to merge data and evidence with the human experience and qualitative feedback, especially when dealing with school safety, which can bring up a variety of emotions, concerns, and opinions.\(^2\)

When communicating with the school community or media, data can be used to provide concrete evidence to counteract misunderstandings and misconceptions, and to help address concerns that may exist. The School Superintendent Association released the following list regarding sharing data and data visualizations with the media or community:\(^2\)

**DO:**

- Make sure there is a comprehensive communications plan that addresses the release of potentially controversial data such as school safety reports.
- Make sure staff is apprised of school safety reports and other sensitive data before the media, so everyone is focused on the same messages.
- Talk to the reporter first when inaccuracies surface in a story, such as factually incorrect data. Make sure you have documentation to back up your claim.

**DON’T:**

- Don’t wait until the day reports are released to deepen the media’s understanding of what is being measured, how it will be used, and what the results tell parents and community members. This should be an ongoing process. Be proactive.
- Don’t hide data from reporters.
- Don’t neglect to share what is working in the district. Suggest feature stories that show trends in school improvement backed by data.
**Safe Schools for Alex**
By analyzing the incidents of physical attack, drug use, bullying, sexual assault, weapons possession, and school suspensions, the [School Safety Dashboard](#) from Safe Schools for Alex can assist communities in their efforts to reduce violence.

**National Forum of Education Statistics**
The [Forum Guide to Data Visualization](#), created by the National Forum of Education Statistics, recommends data visualization practices that can help education agencies communicate data meaning in formats that are accessible, accurate, and actionable.

**American Institute for Research**
The following [interactive set of modules](#) was created by the American Institute for Research and describes how to integrate different data sources to better understand school climate.

**Institute of Education Sciences’ National Center for Education Statistics**
This resource from the Institute of Education Sciences’ National Center for Education Statistics examines data visualization tools used by statewide longitudinal data systems in Michigan, Maryland, and Hawaiʻi. It can be referred to for examples on how these programs select appropriate tools and strategies.

**U.S. Census Bureau**
The [school enrollment data visualizations](#) created by the U.S. Census Bureau are interactive and contain text for labeling, but do not have the narrative text of infographics. They can be referenced as effective examples of simplifying information and making use of the human ability to see patterns and trends.

**YouTube Video: Telling Data Stories**
In this video, you will learn how to make decisions using data and learn how to tell a story with data using reports, dashboards, or infographics.

**YouTube Video: The Art of Visualizing Data**
The following [four-minute video](#) provides tips and tricks for getting started with data visualization.
References


