



REL Southwest Ask-A-REL Response

June 2017

Question:

How is data visualization being used to inform college and career initiatives?

Background:

“Data visualization (or data viz) is a broad term referring to both the visual representation of data and the study of the presentation of data in a visual way (Turban, Volonino, & Wood, 2013). Data viz can also be defined as “the presentation of information in graphical or pictorial form, such as dashboards, interactive reports, and interactive presentations” (Brands, 2014, p. 56). Data visualization is becoming more popular as companies and organizations have access to more data and better software tools to handle the data.”¹ Within K-12 public education, state departments of education recognize the need to support local school districts “learn the basics of data visualization (types of visualizations, characteristics of effective visualizations, and the value of using effective visualizations), when and how to use dashboards and scorecards, identifying and using the right visualization tools, and how best to collaborate with school and district data experts to develop and implement successful tools.”² Education leaders desire to use data visualization tools to improve student achievement, including efforts to inform college and career readiness initiatives.

Response:

Following an established REL Southwest research protocol, we conducted a search for research reports as well as descriptive study articles on data visualization. We focused on identifying resources that specifically addressed how data visualization is being used to inform college and career initiatives. The sources included ERIC and other federally funded databases and organizations, research institutions, academic research databases, and general Internet search engines (For details, please see the methods section at the end of this memo.)

We have not evaluated the quality of references and the resources provided in this response. and We offer them only for your reference. Also, we searched the references in the response from the

¹ Adkins, J. K. (2016). Progression of a Data Visualization Assignment. *Information Systems Education Journal*, v14 n6 p20-26. <https://eric.ed.gov/?id=EJ1135684>.

² Churney, A., & Handville, N. L. (2015). *Using Data Visualization and Reporting to Improve Compensatory Education Programs*. Georgia Compensatory Educational Leaders, Inc. 2015 Conference. <http://www.gcel.org/files/102290212.pdf>.

most commonly used resources of research, but they are not comprehensive and other relevant references and resources may exist.

Research References

Herman, P., Carreon, D., Scanlan, S., & Dandapani, N. (2017). *College and career readiness profiles of high school graduates in American Samoa and the Commonwealth of the Northern Mariana Islands (REL 2017-229)*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Pacific.
<https://eric.ed.gov/?id=ED573022>

From the ERIC abstract: “Many jurisdictions use data about college and career readiness to help stakeholders understand whether students are on track to succeed in college and careers after high school graduation. For example, Hawaii includes the percentage of high school graduates from a particular school who later attend college in school-level feedback reports for principals and other stakeholders. In American Samoa and the Commonwealth of the Northern Mariana Islands, education stakeholders have identified high school graduates' college and career readiness as a key concern. Although both jurisdictions are taking steps to improve their data systems, it is unclear what data are available that can be used to determine students' college and career readiness. This study cataloged the availability of college and career readiness data in both jurisdictions, described the functionality of the student data systems based on Data Quality Campaign criteria, and developed profiles of the 2012/13 graduating high school class in American Samoa and of the 2013/14 graduating class in the Commonwealth of the Northern Mariana Islands. The study team identified a set of college and career readiness indicators used in Hawaii as a starting point to develop a profile of each jurisdiction's graduating class. The study team also identified additional indicators in the literature on college and career readiness that are used by other states. The study addressed college and career readiness separately in American Samoa and the Commonwealth of the Northern Mariana Islands. The study team identified the available college and career readiness indicators in each jurisdiction and determined how many of the Data Quality Campaign's 10 Essential Elements of Statewide Longitudinal Data Systems were in place. The study team also created a college and career readiness profile of each jurisdiction's recent high school graduating class based on the identified indicators. In American Samoa: (1) Data were available to develop five college and career readiness indicators: cumulative grade point average, high school graduates, higher level math courses, higher level math course grades, and Stanford Achievement Test 10th Edition (SAT-10) math and reading proficiency; (2) The American Samoa Department of Education's data system includes 6 of the Data Quality Campaign's 10 essential elements: a unique student identifier; student-level enrollment, demographic, and program participation information; the ability to match individual students' test records from year to year to measure academic growth; a teacher identifier system; student-level transcript data, including information on courses passed and grades received; and a state data audit system that assesses data quality, validity, and reliability; (3) Among the 843 high school graduates in the sample, students' mean grade point average was 2.84, fewer than 60 percent of students passed at least one

semester of a higher level math course, and most students scored at the below basic proficiency level in math and reading on the SAT-10; and (4) On average female students had a higher cumulative grade point average and higher SAT-10 reading proficiency than did male students, and a higher percentage of female students than of male students passed at least one semester of precalculus and calculus. In the Commonwealth of the Northern Mariana Islands: (1) Data were available to develop six college and career readiness indicators: Advanced Placement courses, cumulative grade point average, high school graduates, higher level math courses, higher level math course grades, and SAT-10 math and reading proficiency; (2) No systemwide student longitudinal data system was in place. Separate offices and departments collect and manage student enrollment data and SAT-10 results, and individual high schools store academic information; (3) The Commonwealth of the Northern Mariana Islands' data systems include 3 of the Data Quality Campaign's 10 essential elements: student-level enrollment, demographic, and program participation information; the ability to match individual students' test records from year to year to measure academic growth; and student-level transcript data, including information on courses passed and grades received; (4) Among the 587 high school graduates in the sample, 9.4 percent of students passed at least one quarter of Advanced Placement calculus and 38.7 percent passed an Advanced Placement English course, students' mean grade point average was 2.81, and most students scored at the average proficiency level on both the SAT-10 math and reading exam; and (5) On average female students had higher cumulative grade point averages and higher SAT-10 reading proficiency than did male students, and a higher percentage of female students than of male students passed at least one quarter of precalculus and Advanced Placement English. The following are appended: (1) Literature review on college and career readiness indicators; (2) Data and methods for the American Samoa analysis; (3) Data and methodology for the Commonwealth of the Northern Mariana Islands analysis; and (4) Algebra II course completion and grades.”

Stevens, C. S., Marder, M., & Nagel, S. R. (2015). Patterns in Illinois educational school data. *Physical Review Special Topics - Physics Education Research*, 11(1), 010113-1-010113-10. <https://eric.ed.gov/?id=EJ1066154> <https://eric.ed.gov/?id=ED573022>

From the ERIC abstract: “We examine Illinois educational data from standardized exams and analyze primary factors affecting the achievement of public school students. We focus on the simplest possible models: representation of data through visualizations and regressions on single variables. Exam scores are shown to depend on school type, location, and poverty concentration. For most schools in Illinois, student test scores decline linearly with poverty concentration. However, Chicago must be treated separately. Selective schools in Chicago, as well as some traditional and charter schools, deviate from this pattern based on poverty. For any poverty level, Chicago schools perform better than those in the rest of Illinois. Selective programs for gifted students show high performance at each grade level, most notably at the high school level, when compared to other Illinois school types. The case of Chicago charter schools is more complex. Up to 2008, Chicago charter and neighborhood schools had similar performance scores. In the last few years, charter students' scores overtook those of students in traditional schools as the number of charter school locations increased.”

Additional Organizations to Consult

Alabama School Connection (ASC): Measuring college readiness: Remediation rates — <http://alabamaschoolconnection.org/2016/03/22/measuring-college-readiness-remediation-rates/>

From the website: “The Alabama School Connection has published remedial rates by school since the class of 2012 entered college, but as our data visualization skills have improved over the years, the compilation below might prove easier to navigate.

[The spreadsheet used to create the data visualization is here.](#) All data comes from the [Alabama Commission on Higher Education Student Database Reports.](#)”

The College and Career Readiness and Success Center (CCRS) at the American Institutes for Research: CCRS Interactive State Map — <http://www.ccrscenter.org/ccrs-landscape/state-profile>

From the website: “The CCRS Interactive State Map presents the broad landscape of college and career readiness. The map provides a snapshot of key college and career readiness policies, including:

- College and Career Ready Definitions
- College and Career Ready Metrics
- Programs and Structures

The profiles for each state were developed from a variety of sources, including publicly available information from the websites of state education agencies, the U.S. Department of Education, and private organizations. The profiles were also developed from work by the Regional Educational Laboratory (REL) Midwest on early warning systems and the Center for American Progress report “Making the Grade” on state accountability systems. These profiles are not intended to be a comprehensive view of all college and career readiness policies, programs, and initiatives within each state. Due to limitations of the search there may be information on state policies not included on the map. Links to additional information and resources for each state related to college and career readiness also are included.

The state map is updated on a regular basis to ensure state profiles reflect accurate, up-to-date information. For more information about our state map or guidance on how to use this resource, please contact us at ccrscenter@air.org.”

Mapping College Ready Policies 2015-16: College and Career Ready Policies in the States— <http://atlas.newamerica.org/mapping-college-readiness>

From the website: “This report is a best effort compilation of state policies impacting college and career readiness. This database identifies college- and career-ready definitions, standards, and assessments that have been formally adopted by states. Additionally, the database identifies state policies on high school course requirements, minimum higher education admission standards, merit aid requirements, and first-year college course placement.

Given that some state websites do not clearly present this information, where possible this information has been verified by states' Elementary and Secondary Education Act (ESEA) Flexibility Requests most recently approved by the U.S. Department of Education. In some cases, state policies that have previously been reported may be absent if no documentation has been made publicly available or if policies have not been officially adopted. Citations have been included for each data point reported. The data collected reflect the researcher's best efforts to collect valid information for each state surveyed."

Forecast5 Analytics, 5Lab: Accelerate College and Career Readiness—

<http://www.forecast5analytics.com/product/5-lab>

From the website: "Discovery, insights, and innovation - 5Lab allows you to maximize the value of your data, so you can maximize the opportunities for your students.

A robust and scalable solution, you can generate powerful analytics, reports and customized dashboards by connecting disparate datasets into an analytic "sandbox".

Combine all your disparate datasets into one desktop to analyze and develop action plans for improving student outcomes. 5Lab presents your information in easy-to-understand visual dashboards. You can quickly build and customize the views of your data for all levels of administration and building leadership."

Methods

Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

Data visualization

College readiness

Career readiness

Data visualization and career readiness

Data visualization and career readiness

Data mining and college and career readiness

Databases and Resources

We searched ERIC for relevant resources. ERIC is a free online library of over 1.6 million citations of education research sponsored by the Institute of Education Sciences. Additionally, we searched Google Scholar.

Reference Search and Selection Criteria

When we were searching and reviewing resources, we considered the following criteria:

Date of the publication: References and resources published for last 15 years, from 2001 to present, were include in the search and review.

Search Priorities of Reference Sources: Search priority is given to study reports, briefs, and other documents that are published and/or reviewed by IES and other federal or federally funded organizations, academic databases, including ERIC, EBSCO databases, JSTOR database, PsychInfo, PsychArticle, and Google Scholar.

Methodology: Following methodological priorities/considerations were given in the review and selection of the references: (a) study types – randomized control trials,, quasi experiments, surveys, descriptive data analyses, literature reviews, policy briefs, etc., generally in this order (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected, etc.), study duration, etc. (c) limitations, generalizability of the findings and conclusions, etc.

This memorandum is one in a series of quick-turnaround responses to specific questions posed by stakeholders in the Southwest Region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas), which is served by the Regional Educational Laboratory (REL) Southwest at SEDL. This memorandum was prepared by REL Southwest under a contract with the U.S. Department of Education's Institute of Education Sciences (IES), Contract ED-IES-12-C-0012, administered by SEDL. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.