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Statistics Online Computational Resource for Education

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# Statistics Online Computational Resource for Education

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**Summary**

The Statistics Online Computational Resource (www.SOCR.ucla.edu) provides one of the largest collections of free Internet-based resources for probability and statistics education. SOCR develops, validates and disseminates two core types of materials – instructional resources and computational libraries.

## ◆ RESOURCES ◆

The Statistics Online Computational Resource (SOCR) at http://www.SOCR.ucla.edu is a free, interactive and Internet-accessible resource for data exploration, modelling, analysis and interpretation. SOCR is a National Science Foundation (NSF)-funded national centre for statistical education and computing. SOCR designs, implements and disseminates Java demonstration applets, Web-based course materials and interactive aids for information technology-based instruction and statistical computing (Dinov 2006b; Leslie 2003). The SOCR Motto 'It's Online, Therefore It Exists!' implies that all of these resources are freely available on the Internet. SOCR provides two core types of materials – *instructional resources* and *computational libraries*.

### Instructional resources

SOCR includes several interactive learning and instructional aids. Figure 1 shows an example of an SOCR data set used for interactive demonstration of various statistical techniques available in SOCR Analyses. Data-driven motivational problems enable hands-on exploration of statistical methodologies using real data. Data can be directly copy-pasted in SOCR Charts, Analyses or other tools for interactive exploratory or statistical analysis. The SOCR instructional resources include electronic books, refreshers, guidelines for statistical consulting, lecture notes, documentations and tutorials. Information about these resources is available online at http://wiki.stat.ucla.edu/socr/index.php/SOCR_EduMaterials.

### Computational libraries

The SOCR computational libraries are used for statistical computing by external programs or by the SOCR HTML graphical user interfaces (Dinov 2006a). There are six types of core SOCR libraries and applets. These are *Distributions*, *Experiments*, *Analyses*, *Games*, *Modeler* and *Charts*. Interactive probability distributions, virtual simulations, statistical analysis tools, interactive games, data modelling and parameter estimation, and tools for exploratory data analysis and visualization are demonstrations of the core six SOCR computational libraries. Detailed information about each of these classes, and their libraries, is available online at http://wiki.stat.ucla.edu/socr/index.php/SOCR_Help_Pages.

## ◆ DISCUSSION AND UTILIZATION ◆

The SOCR educational pages contain various demonstrations of classroom use of SOCR resource for K-12 education (e.g., http://wiki.stat.ucla.edu/socr/index.php/SOCR_Events_May2008), lower and upper division (e.g., http://wiki.stat.ucla.edu/socr/index.php/SOCR_Courses_2007_2008) undergraduate curricula. Instructors, students and self-learners are encouraged to test these materials using their own data or data provided by SOCR (http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data). Exploration of the relations between all different SOCR components facilitate statistical learning and demonstrate the integrated nature of these learning resources, computational libraries and
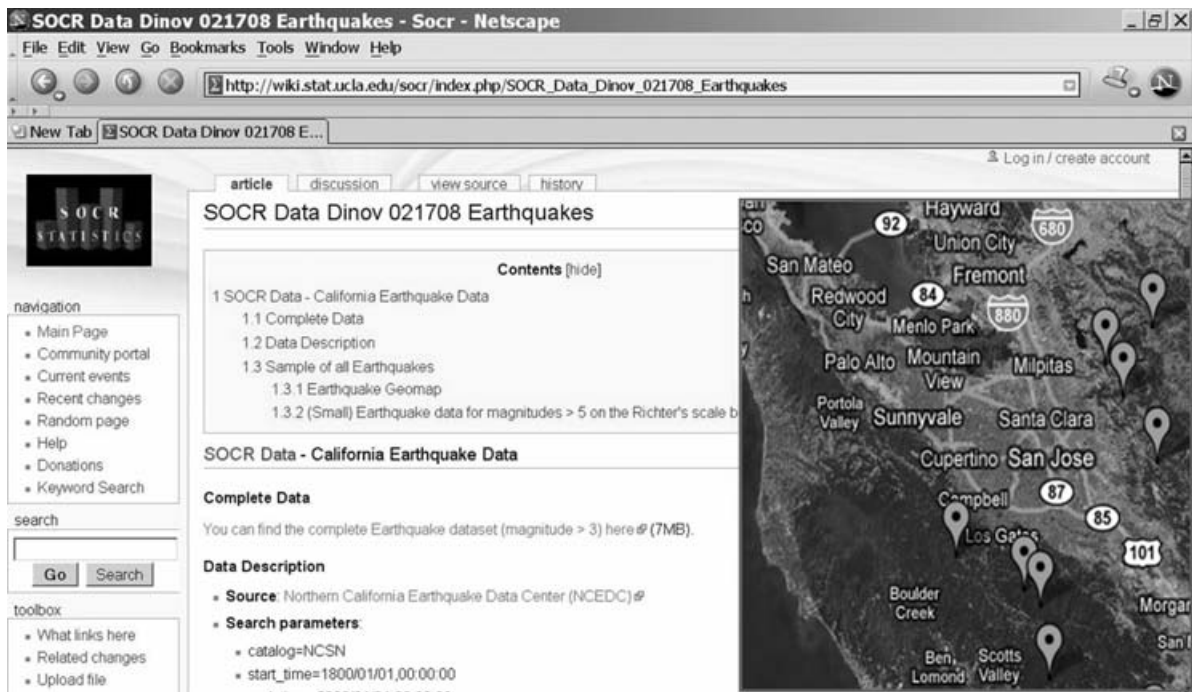
**Fig. 1.** An example of SOCR interactive aids. In addition to the earthquake demographic data, this data set includes a GIS map of the earthquake locations (http://wiki.stat.ucla.edu/socr/index.php/SOCR_Data)
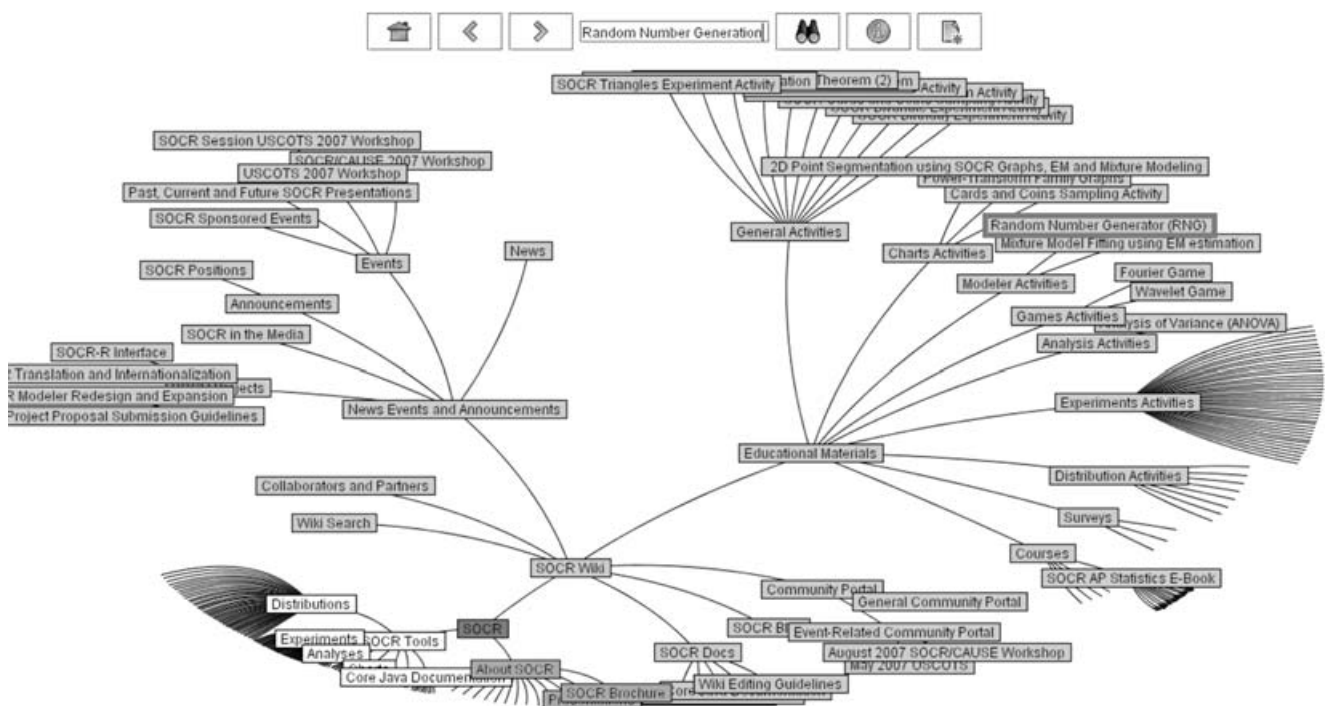


**Fig. 2.** The SOCR hyperbolic graphical interface at http://socr.ucla.edu/SOCR_HT_ResourceViewer.html provides a user-friendly portal for discovery of SOCR materials, computational tools and Web applets

instructional materials. Our experiences of teaching dozens of classes and thousands of students over the past 5 years (Dinov et al. 2008) assure us that the SOCR resources improve student motivation, lower the learning curve for novice learners, provide useful hands-on activities and training materials, and advance statistical literacy. The most effective way to explore the SOCR materials is using the keyword-search and/or the mouse-controls of the hyperbolic graphical interface (http://socr.ucla.edu/SOCR_ HT_ResourceViewer.html) shown in figure 2. At this interface the user may browse, search or traverse the SOCR materials. Double-clicking on

any node opens a new browser window with the selected resource.

## Acknowledgements

## References

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