

Activity-based Learning Using Real-Time Online Hands-on Activities

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Do you use hands-on activities in your class?

Would you like to share your hands-on activities?

Would you be interested in using data collected by students from different classes in different institutions?

Would you be interested in sharing your students' data with others?

Does it take more time than you would like to spend in your class for hands-on activities?

Do you have to enter the hands-on activity data yourself after the class period?

If your answer to any of the above questions is “YES”, then, this Real-Time Online Database approach should be beneficial to your class. The following are the real-time online hands-on activities that are currently available on the web site at <http://stat.cst.cmich.edu/statact/> .

Activity	Title
Distance	How far are you away from home?
Hand_Size	Is hand size a good predictor of height?
Exercise	How does one minute of exercise affect your pulse rate?
Raisins	How many raisins are in a 1/2 oz box?
College_Life	Are you satisfied with your university?
Left_Right_Hand	Are you left handed or right handed?
Sampling	Random sampling vs. subjective sampling. Which is better?
Vote	Which party will you vote for?
Draw_Line	Can you draw a straight line without a ruler?

This Real-Time Online Database is the result from an NSF/CCLI project under the grant #0310932. The goal of the project is to adapt, implement and evaluate an Activity-Based, Cooperative learning and Technology (*ACT*) curriculum in statistics courses for non-majors and prospective K-12 teachers at Central Michigan University.

The guiding principles include:

- People learn better by constructing knowledge themselves through guided processes.
- Practice and feedback are essential ingredients for understanding new concepts.
- Active problem-solving through teamwork promotes active learning.

The online activities are related to students' everyday life. The data are collected from students and owned by students. Data collected from different classes and different schools are shared globally. Instructors can use the data for classroom activities as well as homework or projects. Together with the use of the WebStat, an online statistical analysis tool, or any statistical software available, the instructor can spend the valuable classroom time on leading students to learn the important concepts and the process of statistical investigation. The only requirement is the access of internet.

In this presentation, we plan to demonstrate how to use the real-time online database to teach statistics and demonstrate how the process of statistical investigation is applied in class using the real-time online activities.

The need for reforming statistics education is well documented by Statistics & Mathematics organizations and in the NCTM standards. The areas of suggested reform include (a) the need for data and data production, the importance of variability, and the importance of written and oral presentations, and (b) the need for changing teaching strategies, using technology, and developing an active learning environment. The general principles on how students learn statistics are by constructing knowledge, active involvement in activities, practicing, and informed consistent assessment. Technology has become essential in the teaching and practice of statistics. Recent studies show that an activity-based learning strategy enhances students' conceptual understanding of statistics and mathematics and engages students with different learning styles.

Our ultimate goals of this project include helping students to develop (1) problem-solving and statistical reasoning skills, (2) teamwork spirit and an ability to work as a contributing team member; (3) positive attitudes towards the increasingly quantitative world, (4) the ability of developing and facilitating activities-based curriculum in their future classrooms for prospective teachers, and (5) better written and presentation skills.

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