

## Interactive Learning with R-Markdown and R-Shiny: Statistics for Economics and Business

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Many students find understanding of some complex statistical concepts difficult. An example of such a concept is the confidence interval, especially because of the amalgamation of multiple concepts including the standard error, point estimate, and sample size into one equation. Computer technology can greatly enhance statistics education by illustrating fundamental concepts. We develop Interactive Learning apps based on R-Markdown with embedded R-Shiny components by providing interactive HTML documents to assist students with their learning process of complex statistical concepts in tutorials and homework. Our Interactive Learning Documents (ILDs) are programs developed in R language that perform specific tasks in assisting students during their interactive learning process outside the usual classroom. We provide initial student feedback regarding the design, advantages, and disadvantages of the current prototype ILDs and inform workshop participants about future generations of ILDs under development.

With R-Shiny, instructors can easily build teaching tools that are interactive, dynamic, user-friendly, visually appealing and with similar functionality to Java/Javascript applets. These shiny apps can be embedded within a R-Markdown framework (learnr package) to build interactive tutorials/homework to be distributed via Shinyapps.io server in form protected SSL encrypted HTML documents. The instructor only needs some familiarity with R to produce such human-machine interactive teaching tools. In this workshop we show how to develop and effectively utilise R-Markdown and R-Shiny in an interactive learning model for an introductory Statistics for Economics and Business module. Moreover, we provide workshop attendees with the opportunity to engage with some of our interactive learning teaching tools via mobile phone and other interface technologies.