

Teaching Statistics to Psychology Students using Reproducible Computing package RC and supporting Peer Review Framework

Ian Holliday

(Aston University, UK)

Patrick Wessa

(K.U. Leuven, Belgium)



Background

- Statistics is a requirement of the BPS GBR (British Psychological Society Graduate Basis for Chartership – the first stage towards professional status).



Background

- Statistics is a requirement of the BPS GBR (British Psychological Society Graduate Basis for Chartership – the first stage towards professional status).
- Undergraduate course typically include 20 credit modules in stats in both years 1 and 2 (1/6th.)



Background

- Statistics is a requirement of the BPS GBR (British Psychological Society Graduate Basis for Chartership – the first stage towards professional status).
- Undergraduate course typically include 20 credit modules in stats in both years 1 and 2 (1/6th.)
- Final year must include an experimental research project work (typically 30 credits = 1/4)
- .



Background

- Statistics is a requirement of the BPS GBR (British Psychological Society Graduate Basis for Chartership – the first stage towards professional status).
- Undergraduate course typically include 20 credit modules in stats in both years 1 and 2 (1/6th.)
- Final year must include an experimental research project work (typically 30 credits = 1/4)
- Many student's still struggle with stats: final year dissertations reveal many students have a poor grasp of basic stats concepts



Background

- Statistics is a requirement of the BPS GBR (British Psychological Society Graduate Basis for Chartership – the first stage towards professional status).
- Undergraduate course typically include 20 credit modules in stats in both years 1 and 2 (1/6th.)
- Final year must include an experimental research project work (typically 30 credits = 1/4)
- Many student's still struggle with stats: final year dissertations reveal many students have a poor grasp of basic stats concepts
- Up to 11% of published psychology research articles contain 1 or more statistical errors.

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking

* Guidelines for Assessment and Instruction in Statistics Education

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking
 - Use real data

* Guidelines for Assessment and Instruction in Statistics Education

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking
 - Use real data
 - Stress conceptual understanding rather than mere knowledge of procedures

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking
 - Use real data
 - Stress conceptual understanding rather than mere knowledge of procedures
 - Foster active learning in the classroom

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking
 - Use real data
 - Stress conceptual understanding rather than mere knowledge of procedures
 - Foster active learning in the classroom
 - Use technology for developing conceptual understanding and analyzing data

GAISE*

- The American Statistical Association (ASA) GAISE report made six recommendations :
 - Emphasize statistical literacy and develop statistical thinking
 - Use real data
 - Stress conceptual understanding rather than mere knowledge of procedures
 - Foster active learning in the classroom
 - Use technology for developing conceptual understanding and analyzing data
 - Use assessments to improve and evaluate student learning

Garfield et al. (2002) “First Courses in Statistical Science:
The Status of Educational Reform Efforts”

- “It is one thing to state that statistical thinking and reasoning should be the focus of a course, or should be the desired course outcomes. It is another matter entirely to achieve this...”



Garfield et al. (2002) “First Courses in Statistical Science:
The Status of Educational Reform Efforts”

- “It is one thing to state that statistical thinking and reasoning should be the focus of a course, or should be the desired course outcomes. It is another matter entirely to achieve this...”
- “ We believe that appropriate content, a focus on data analysis and real problems, and careful use of high quality technological tools will help students better achieve the suggested course goals and outcomes.”



Enhancing Stats Education with New Technology '80s Style

The Classroom Calculator

Finally, a front-of-the-room calculator that lets students observe both the keystroke sequence and displayed answer.

Model 30
\$1,495

Other popular
models
available.



Easily viewable from
up to 60 feet.

Watch student
enthusiasm grow as
you use The
Classroom Calculator!

The Classroom Calculator puts an end to dull blackboard listings and allows students to see the logic of each step in a calculation.

Size: 46" \times 23" \times 3"
Weight: Approximately 6 lbs.
Power: 110 Volt AC
Mounting strip included.

PureTech Inc.
1700 Duncan Avenue
Technology Park
Hubbell, MI 49934
(906) 487-2494

Complete documentation included with each unit.

The Reform of [Statistics] Pedagogy

- **Goals:**
 - Higher-order thinking, problem solving, flexible skills applicable to unfamiliar settings.

The Reform of [Statistics] Pedagogy

- **Goals:**
 - Higher-order thinking, problem solving, flexible skills applicable to unfamiliar settings.
- **The old model:**
 - Students learn by absorbing information; a good teacher transfer information clearly and at the right rate.

The Reform of [Statistics] Pedagogy

- **Goals:**
 - Higher-order thinking, problem solving, flexible skills applicable to unfamiliar settings.
- **The old model:**
 - Students learn by absorbing information; a good teacher transfer information clearly and at the right rate.
- **The new model:**
 - Students learn through their own activities; a good teacher encourages and guides their learning.

The Reform of [Statistics] Pedagogy

- **Goals:**
 - Higher-order thinking, problem solving, flexible skills applicable to unfamiliar settings.
- **The old model:**
 - Students learn by absorbing information; a good teacher transfer information clearly and at the right rate.
- **The new model:**
 - Students learn through their own activities; a good teacher encourages and guides their learning.
- **What helps learning:**
 - Group work in and out of class; explaining and communicating; frequent rapid feedback; work on problem formulation and open-ended problems.

Encourage “statistical thinking and literacy”.

- The ‘professional’s fallacy’
 - [Psychology] Students are not trainee statisticians.

Encourage “statistical thinking and literacy”.

- The ‘professional’s fallacy’
 - [Psychology] Students are not trainee statisticians.
 - Moore: must abandon "information transfer" and adopt "constructivist" view of learning
 - Emphasise statistical and conceptual thinking
 - be data-focussed
 - be less formulaic
 - emphasise graphical concepts and automate calculation
 - foster active learning

Encourage “statistical thinking and literacy”.

- The ‘professional’s fallacy’
 - [Psychology] Students are not trainee statisticians.
 - Moore: must abandon "information transfer" and adopt "constructivist" view of learning
 - Emphasise statistical and conceptual thinking
 - be data-focussed
 - be less formulaic
 - emphasise graphical concepts and automate calculation
 - foster active learning
 - because “the most effective learning takes place when content (what we want students to learn), pedagogy (what we do to help them learn), and technology reinforce each other in a balanced manner.” (Moore, 1997).

A new approach to statistics Education

- Within the pedagogical paradigm of (social) constructivism permitting:
 - Interaction & collaboration via peer review.
 - Experimentation.

A new approach to statistics Education

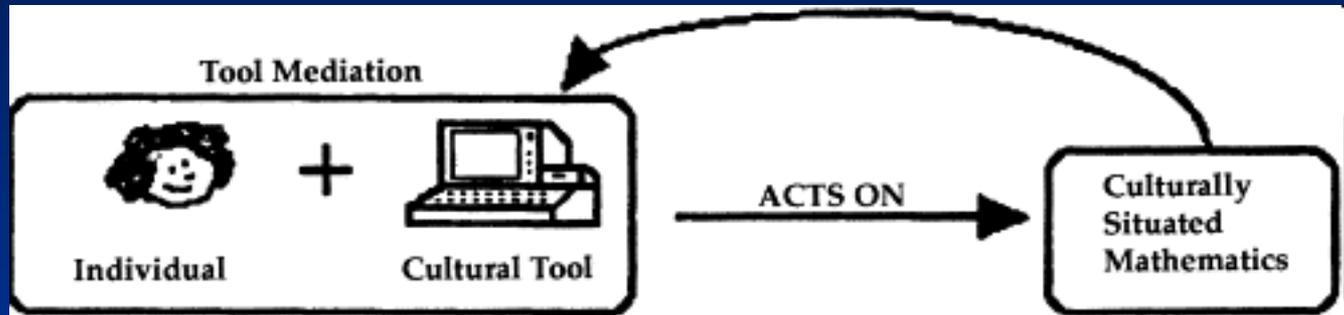
- Within the pedagogical paradigm of (social) constructivism permitting:
 - Interaction & collaboration via peer review.
 - Experimentation.
- Responsibility (social control)
 - learning & computing technology.
 - we need to Free Statistics of irreproducible research.

A new approach to statistics Education

- Within the pedagogical paradigm of (social) constructivism permitting:
 - Interaction & collaboration via peer review.
 - Experimentation.
- Responsibility (social control)
 - learning & computing technology.
 - we need to Free Statistics of irreproducible research.
- www.FreeStatistics.org

Constructivism

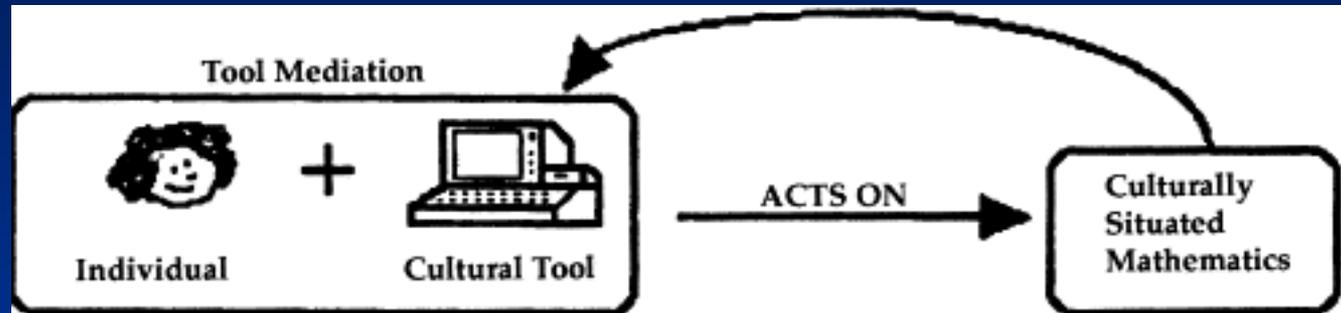
Social



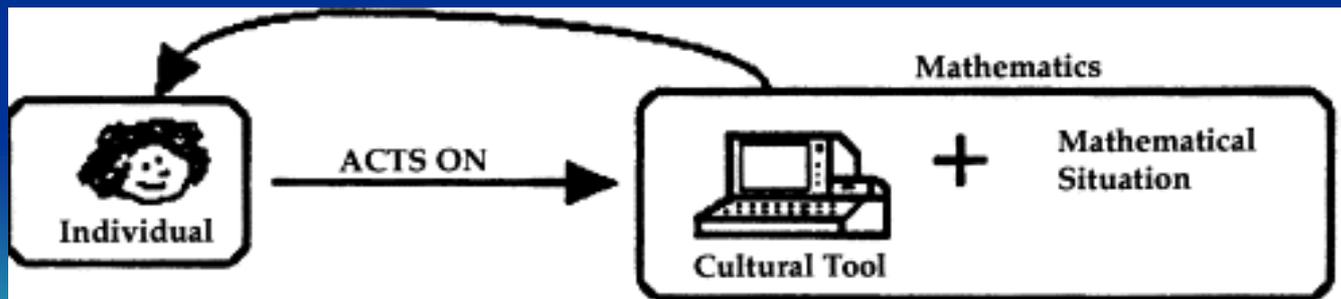
Smith, 1998

Constructivism

Social



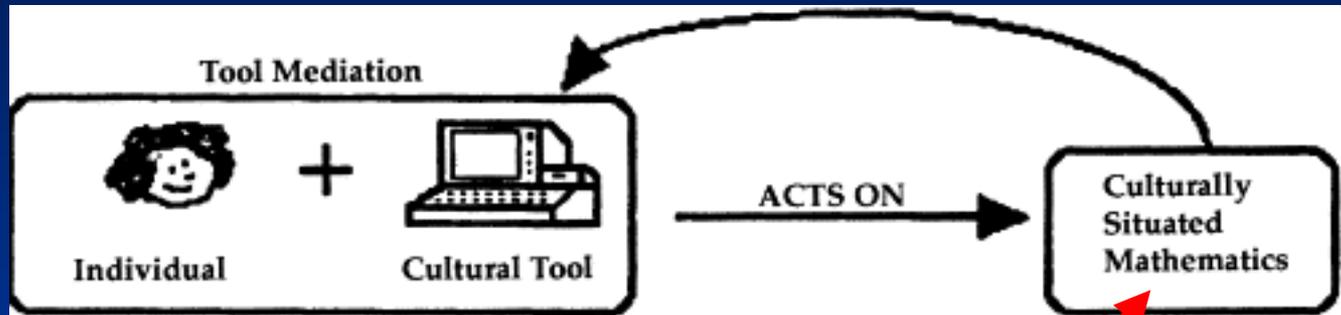
Individual



Smith, 1998

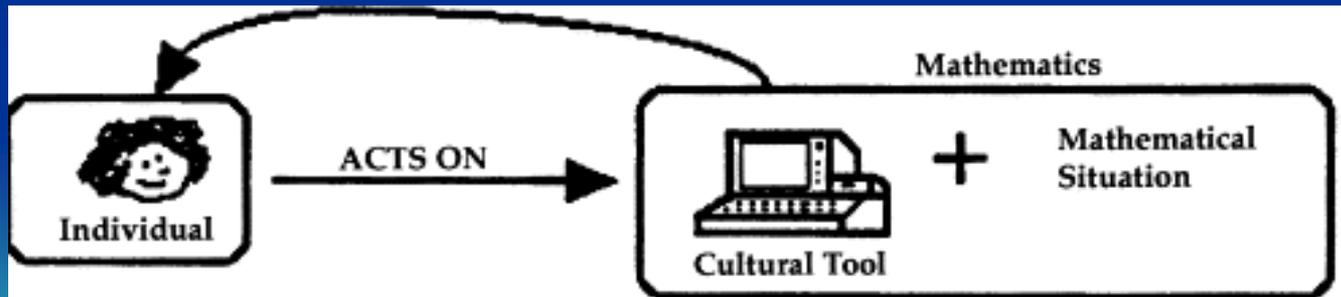
Constructivism

Social



Data Sharing and Peer reviewing via compendiums

Individual



Smith, 1998

Compendiums

- Documents that allow us to preserve, reproduce, and re-use the results of data analysis.



Compendiums

- Documents that allow us to preserve, reproduce, and re-use the results of data analysis.
 - Data can be preserved and shared through the internet.



Compendiums

- Documents that allow us to preserve, reproduce, and re-use the results of data analysis.
 - Data can be preserved and shared through the internet.
 - Analysis can be studied and checked by other researchers.



Compendiums

- Documents that allow us to preserve, reproduce, and re-use the results of data analysis.
 - Data can be preserved and shared through the internet.
 - Analysis can be studied and checked by other researchers.
 - New compendiums can be created to communicate new findings.



'Classical' vs. RC Compendium

- 'classical' compendium
 - Typically a zip file with
 - data files
 - R scripts
 - Sweave documents ...



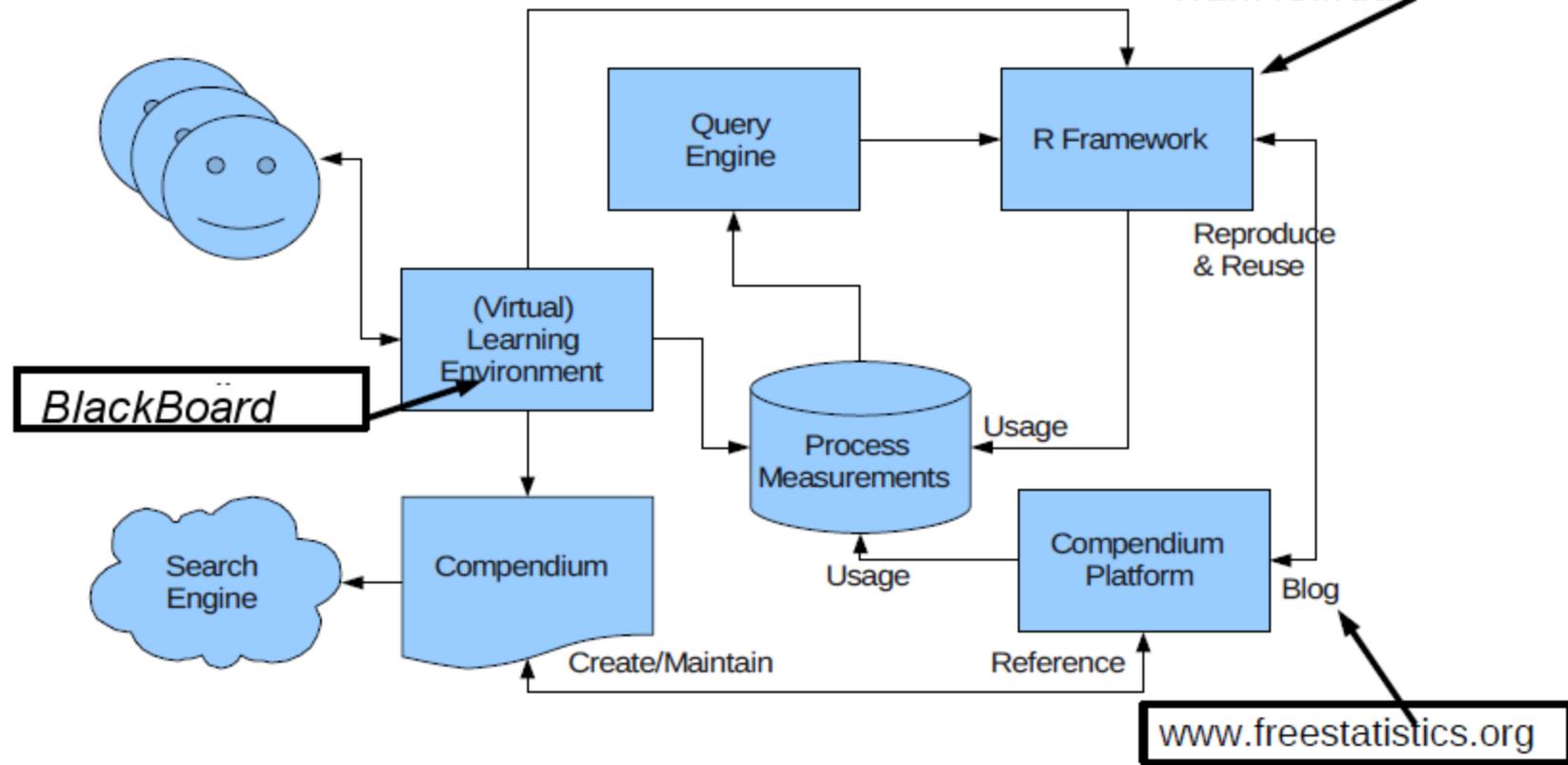
'Classical' vs. RC Compendium

- 'classical' compendium
 - Typically a zip file with
 - data files
 - R scripts
 - Sweave documents ...
- RC compendium
 - Simple document form (ODF, PDF, .doc..)
 - Containing links to remotely stored computations.
 - Accessed via any browser



Learning System or Educational Laboratory?

*WWW.wessa.net
/lanHolliday*



Features of the Compendium Platform

- Any computation that is created within the R Framework can be easily archived in the repository
 - there is no need for students to keep track of the data, the model parameters, or the underlying statistical software code;

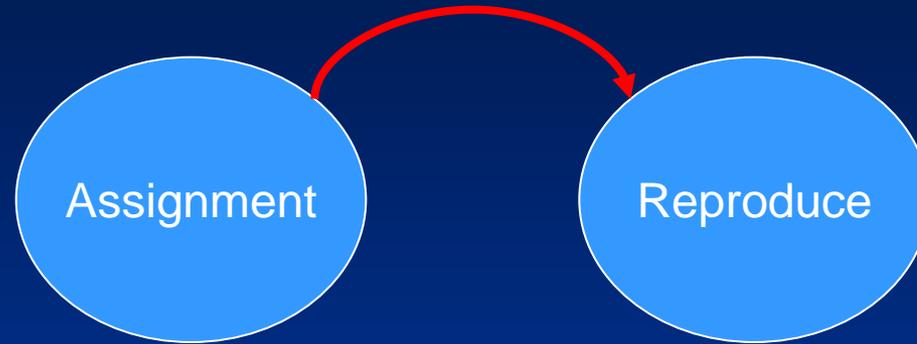
Features of the Compendium Platform

- Any computation that is created within the R Framework can be easily archived in the repository
 - there is no need for students to keep track of the data, the model parameters, or the underlying statistical software code;
- Any user who visits the unique URL of an archived computation is able to instantly reproduce the computation or reuse it for further analysis
 - only an internet browser (and an active connection) is required to use the repository;

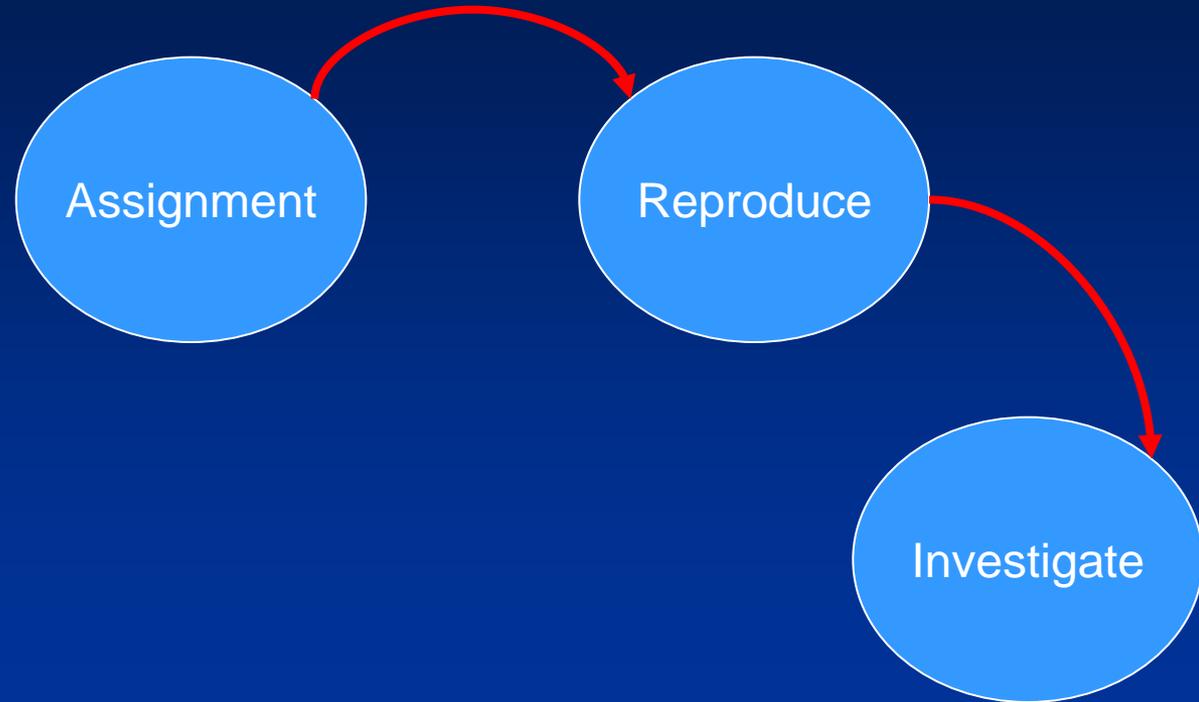
Features of the Compendium Platform

- Any computation that is created within the R Framework can be easily archived in the repository
 - there is no need for students to keep track of the data, the model parameters, or the underlying statistical software code;
- Any user who visits the unique URL of an archived computation is able to instantly reproduce the computation or reuse it for further analysis
 - only an internet browser (and an active connection) is required to use the repository;
- Educators and researchers are able to retrieve data for research purposes.

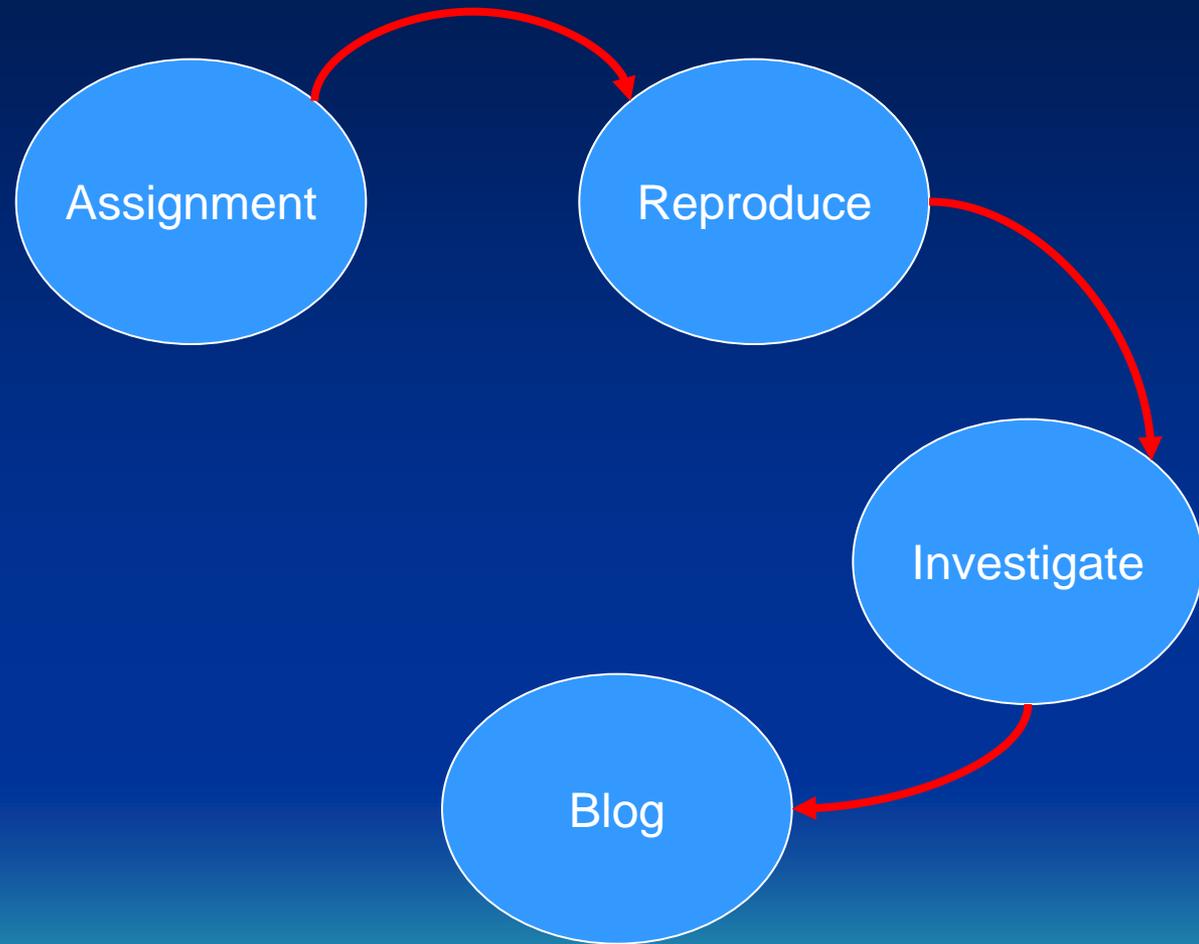
What Students Do.



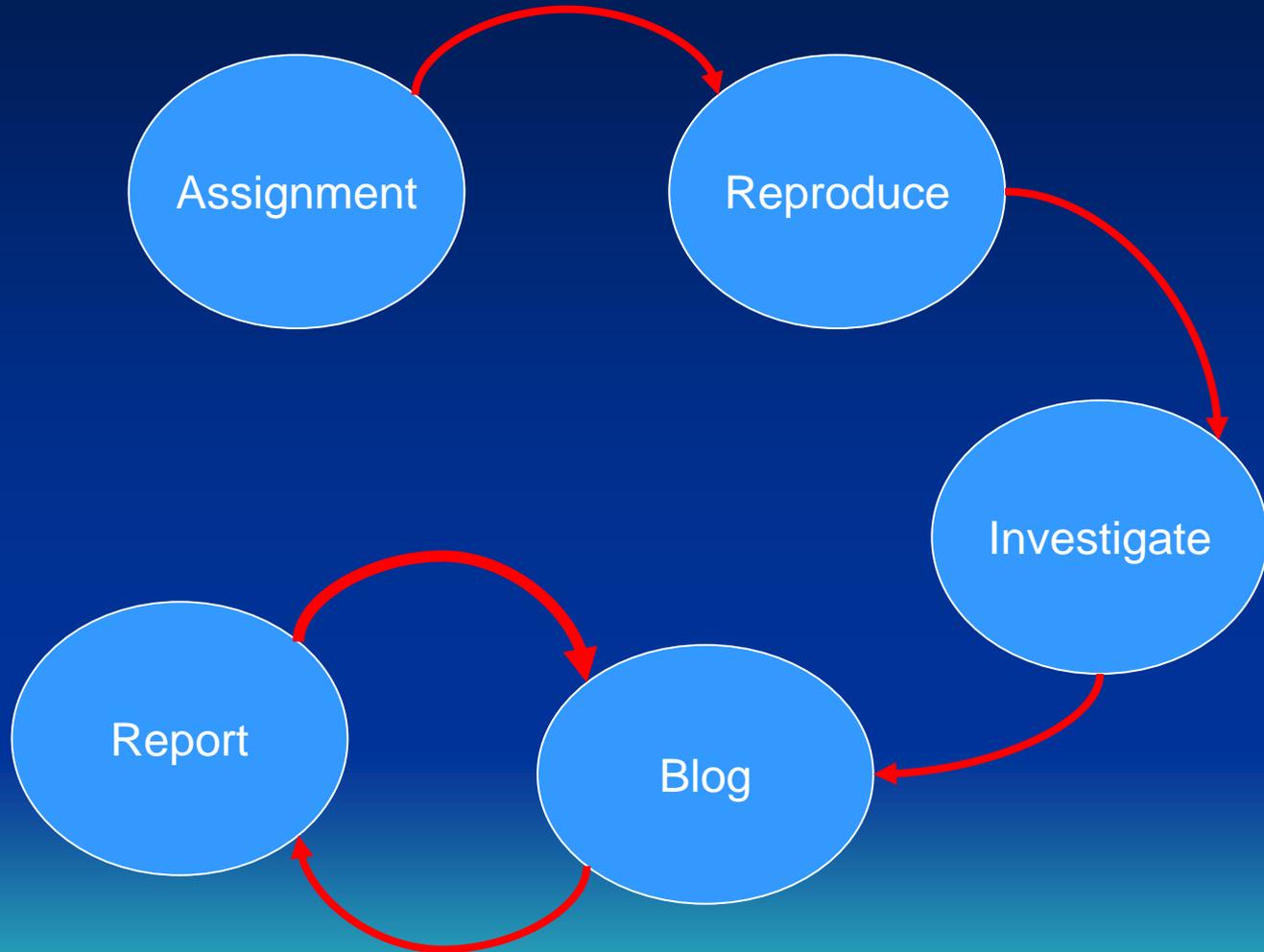
What Students Do.



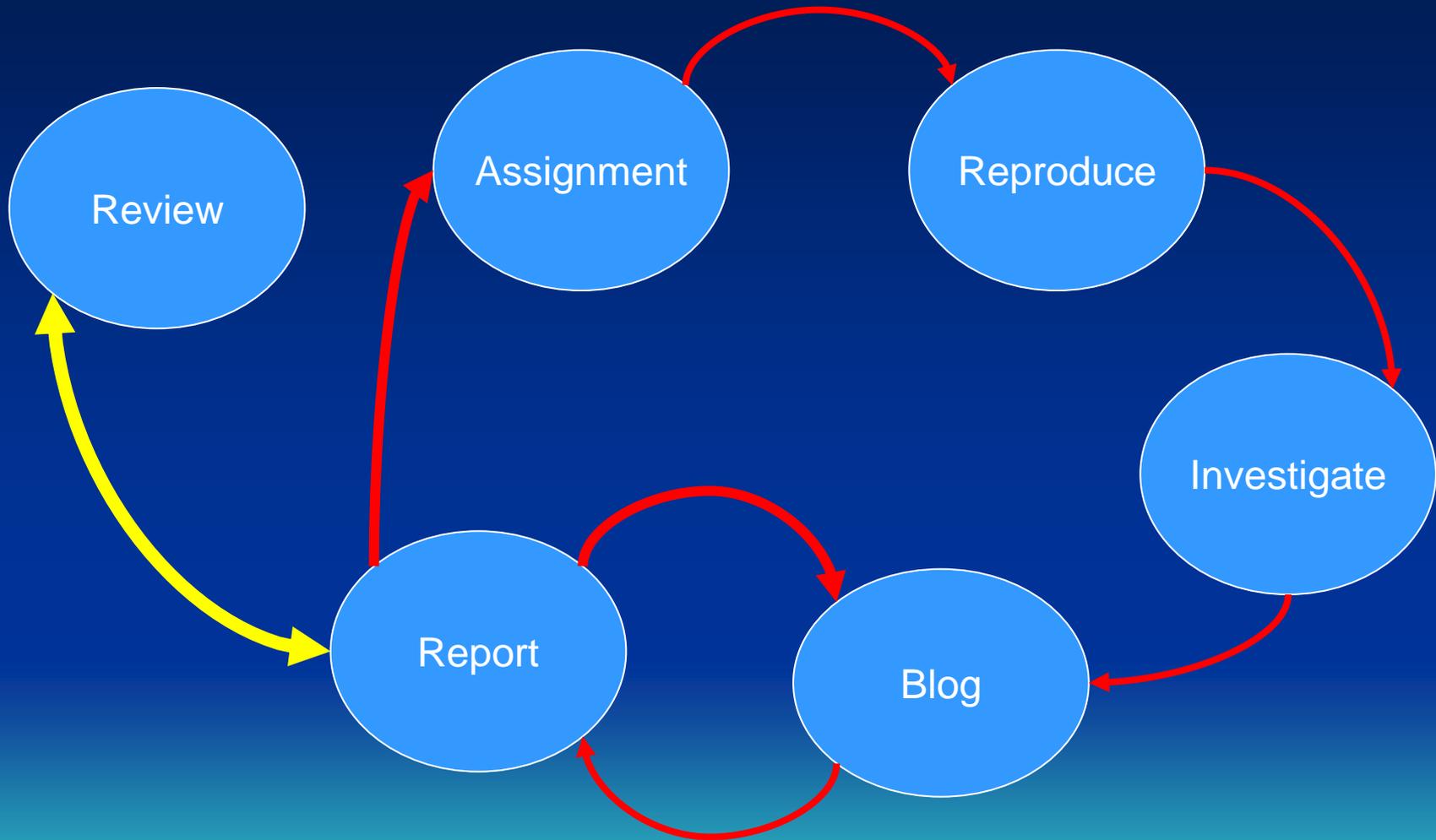
What Students Do.



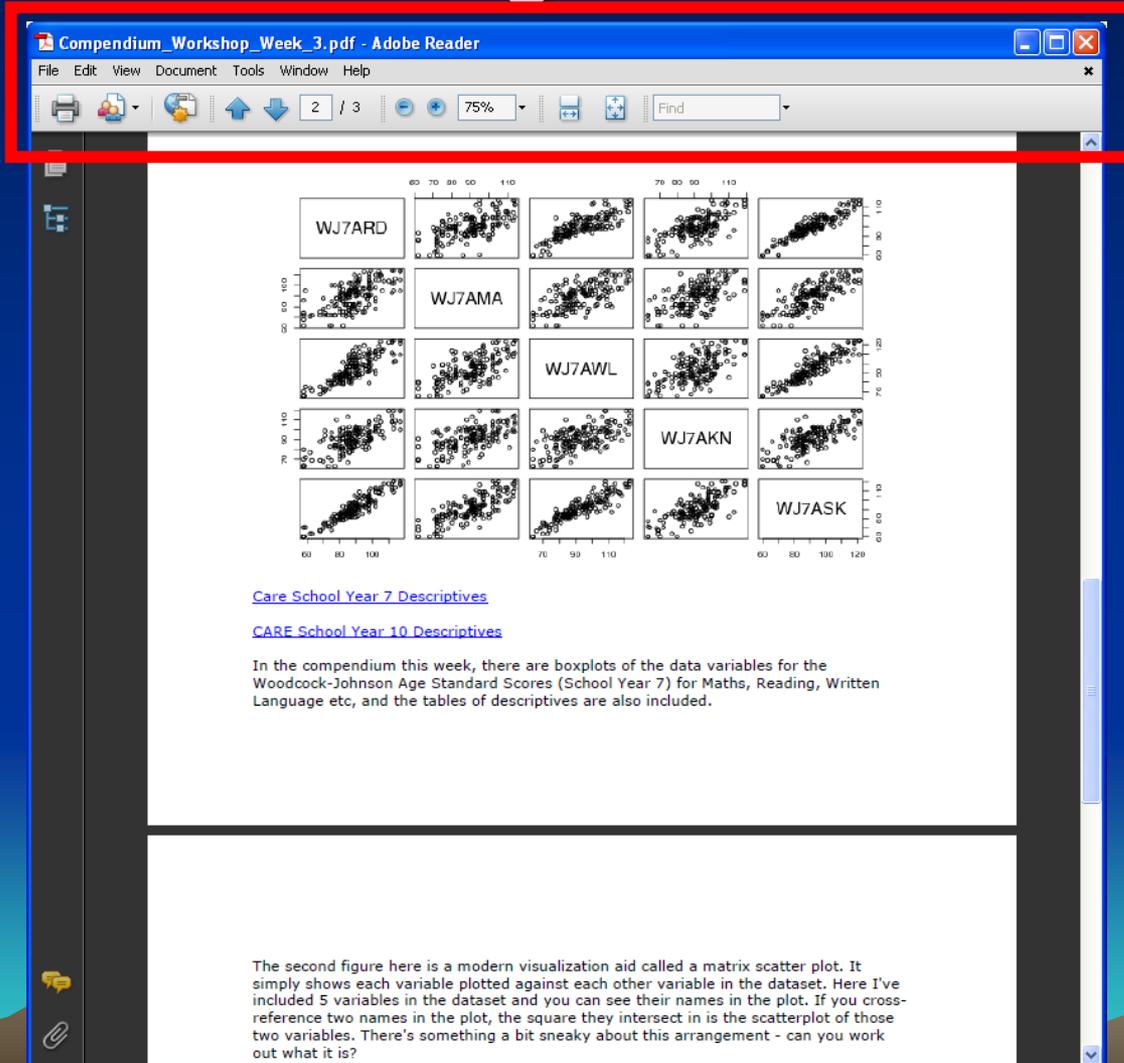
What Students Do.



What Students Do.



Snapshot of a Workshop Assignment Compendium



- Produced in a normal word processor (here I've made a PDF).

<http://www.freestatistics.org/blog/index.php?v=date/2009/Oct/26/t1256547982lxacofnhrqf7g7w.htm/>

Snapshot of a Workshop Assignment Compendium

Compendium_Workshop_Week_3.pdf - Adobe Reader

File Edit View Document Tools Window Help

2 / 3 75% Find

WJ7ARD WJ7AMA WJ7AWL WJ7AKN WJ7ASK

[Care School Year 7 Descriptives](#)

[CARE School Year 10 Descriptives](#)

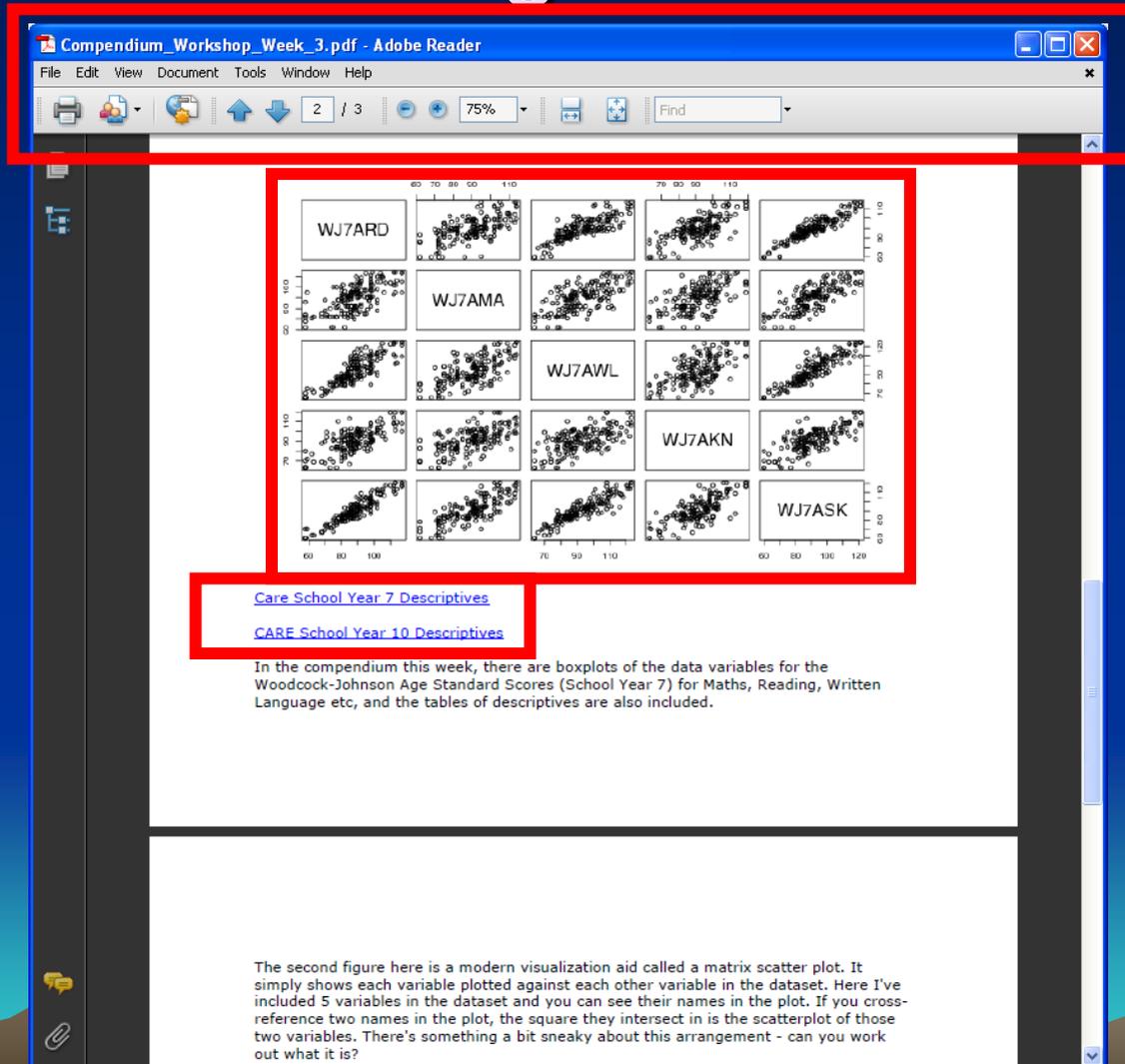
In the compendium this week, there are boxplots of the data variables for the Woodcock-Johnson Age Standard Scores (School Year 7) for Maths, Reading, Written Language etc, and the tables of descriptives are also included.

The second figure here is a modern visualization aid called a matrix scatter plot. It simply shows each variable plotted against each other variable in the dataset. Here I've included 5 variables in the dataset and you can see their names in the plot. If you cross-reference two names in the plot, the square they intersect in is the scatterplot of those two variables. There's something a bit sneaky about this arrangement - can you work out what it is?

- Produced in a normal word processor (here I've made a PDF).
- Shows statistical outputs (graph, tables...)

<http://www.freestats.org/blog/index.php?v=date/2009/Oct/26/t1256547982lxacofnhrqf7g7w.htm/>

Snapshot of a Workshop Assignment Compendium



The screenshot shows a PDF document titled "Compendium_Workshop_Week_3.pdf" in Adobe Reader. The document content includes a 5x5 matrix scatter plot with variables WJ7ARD, WJ7AMA, WJ7AWL, WJ7AKN, and WJ7ASK. Below the plot are two blue hyperlinks: "Care School Year 7 Descriptives" and "CARE School Year 10 Descriptives". A paragraph of text explains the matrix scatter plot, and another paragraph at the bottom asks the reader to identify a "sneaky" feature in the plot's arrangement.

[Care School Year 7 Descriptives](#)

[CARE School Year 10 Descriptives](#)

In the compendium this week, there are boxplots of the data variables for the Woodcock-Johnson Age Standard Scores (School Year 7) for Maths, Reading, Written Language etc, and the tables of descriptives are also included.

The second figure here is a modern visualization aid called a matrix scatter plot. It simply shows each variable plotted against each other variable in the dataset. Here I've included 5 variables in the dataset and you can see their names in the plot. If you cross-reference two names in the plot, the square they intersect in is the scatterplot of those two variables. There's something a bit sneaky about this arrangement - can you work out what it is?

- Produced in a normal word processor (here I've made a PDF).
- Shows statistical outputs (graph, tables...)
- Has links to the blogged analysis.

<http://www.freestats.org/blog/index.php?v=date/2009/Oct/26/t1256547982lxacofnhraf7g7w.htm/>

Snapshot of a Workshop Assignment Compendium

Compendium_Workshop_Week_3.pdf - Adobe Reader

File Edit View Document Tools Window Help

2 / 3 75% Find

WJ7ARD

WJ7AMA

WJ7AWL

WJ7AKN

WJ7ASK

[Care School Year 7 Descriptives](#)

[CARE School Year 10 Descriptives](#)

In the compendium this week, there are boxplots of the data variables for the Woodcock-Johnson Age Standard Scores (School Year 7) for Maths, Reading, Written Language etc, and the tables of descriptives are also included.

The second figure here is a modern visualization aid called a matrix scatter plot. It simply shows each variable plotted against each other variable in the dataset. Here I've included 5 variables in the dataset and you can see their names in the plot. If you cross-reference two names in the plot, the square they intersect in is the scatterplot of those two variables. There's something a bit sneaky about this arrangement - can you work out what it is?

- Produced in a normal word processor (here I've made a PDF).
- Shows statistical outputs (graph, tables...)
- Has links to the blogged analysis.

<http://www.freestats.org/blog/index.php?v=date/2009/Oct/26/t1256547982lxacofnhrqf7g7w.htm/>

Blogged Computation

Blog & Share Statistical Computations at FreeStatistics.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.freestats.org/blog/index.php?v=date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools... TinyURL! Writers and Artists Home Journal of Vision - Opti... Customize Links Journal of Statistical S...

Introduction of a social con... (application/pdf Object) (Untitled) Blog & Share Statistical Co... Blog & Share Statistical Co... Blackboard Academic Suite Blog & Share Statistical...

Home » date » 2009 » Oct » 26 »

Print Search Secure Callback Reproduce Reuse

Care Age 10 Data

The author of this computation has been verified

R Software Module: [Ian.Holliday/rwasp_CARE_Data_Boxplot.wasp](#) (opens new window with default values)

Title produced by software: Boxplot and Trimmed Means

Date of computation: Mon, 26 Oct 2009 03:01:50 -0600

Cite this page as follows:

Statistical Computations at FreeStatistics.org, Office for Research Development and Education, URL <http://www.freestats.org/blog/date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/>, Retrieved Sat, 16 Jan 2010 17:42:15 +0000

BibTeX entries for LaTeX users:

```
@Manual{KEY,
  author = {{YOUR NAME}},
  publisher = {Office for Research Development and Education},
  title = {Statistical Computations at FreeStatistics.org, URL http://www.freestats.org/blog/date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/},
  year = {2010},
}
@Manual{R,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Development Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2010},
}
```

- Unique blog URL to Reproducible Content

Blogged Computation

Blog & Share Statistical Computations at FreeStatistics.org - Mozilla Firefox

http://www.freestats.org/blog/index.php?v=date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/

Home » date » 2009 » Oct » 26 »

Print Search Secure Callback Reproduce Reuse

Care Age 10 Data

The author of this computation has been verified

R Software Module: Ian.Holliday/rwasp_CARE_Data_Boxplot.wasp (opens new window with default values)
Title produced by software: Boxplot and Trimmed Means
Date of computation: Mon, 26 Oct 2009 03:01:50 -0600

Cite this page as follows:
Statistical Computations at FreeStatistics.org, Office for Research Development and Education, URL <http://www.freestats.org/blog/date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/>, Retrieved Sat, 16 Jan 2010 17:42:15 +0000

BibTeX entries for LaTeX users:

```
@Manual{KEY,
  author = {{YOUR NAME}},
  publisher = {Office for Research Development and Education},
  title = {Statistical Computations at FreeStatistics.org, URL http://www.freestats.org/blog/date/2009/Oct/26/t1256547982lkacofnhrqf7g7w.htm/},
  year = {2010},
}
@Manual{R,
  title = {R: A Language and Environment for Statistical Computing},
  author = {{R Development Core Team}},
  organization = {R Foundation for Statistical Computing},
  address = {Vienna, Austria},
  year = {2010},
}
```

- Unique blog URL to Reproducible Content
- Citeable work – also for students!

CARE Data - Boxplot and trimmed Means - Free Statistics and Forecasting Software (Calculators) v.1.1.23-r4 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.wessa.net/lan.Holliday/rwasp_CARE Data Boxplot.wasp

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools... TinyURL! Writers and Artists Home Journal of Vision - Opti... Customize Links Journal of Statistical S...

Introduction of a social... (application/pdf Object) (Untitled) Blog & Share Statistic... Blog & Share Statistic... Blackboard Academic ... Blog & Share Statistic... CARE Data - Boxplo...

::Free Statistics and Forecasting Software:: v1.1.23-r4

Black&White | Blue Theme | Normal Fontsize | Increase Fontsize | Decrease Fontsize | Toggle underline Secure website (SSL) | Private



:: Boxplot and Trimmed Means - Free Statistics Software (Calculator) ::

[Top](#) | [Output](#) | [Charts](#) | [References](#) | [History](#) | [Feedback](#)

All rights reserved. The non-commercial (academic) use of this software is free of charge. The only thing that is asked in return is to [cite this software](#) when results are used in publications.

This free online software (calculator) computes a BoxPlot a matrix observations by row and variables by column. This R module is used in Workshop 2 of the PY2224 statistics course at Aston University, UK. The data vectors were abstracted from the study dataset Bibliographic Citation: Ramey, Craig T., James J. Gallagher, Frances A. Campbell, Barbara H. Wasik, and Joseph J. Sparling. CAROLINA ABECEDARIAN PROJECT AND THE CAROLINA APPROACH TO RESPONSIVE EDUCATION (CARE), 1972-1992 [Computer file]. ICPSR version. Chapel Hill, NC: University of North Carolina [producer], 2002. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2004.

Enter (or paste) a matrix (table) containing all data (time) series. Every column represents a different variable and must be delimited by a space or Tab. Every row represents a period in time (or category) and must be delimited by hard returns. The easiest way to enter data is to copy and paste a block of spreadsheet cells. Please, do not use commas or spaces to separate groups of digits!

Send output to:

Browser Blue - Charts White

Data X:

88	95	95	81	84
98	92	87	90	97
89	95	91	91	88
81	97	84	87	87
88	92	92	89	92
95	104	84	85	91
79	79	84	81	80
91	78	69	80	73
80	79	84	75	73
91	86	84	84	77
85	92	85	91	86
94	78	89	87	82
86	86	83	90	82
82	71	86	72	73
107	90	91	96	99
97	93	90	88	90

Names of X columns:

WJ10AFS WJ10AVA WJ10ARD WJ10AMA WJ10AKN

Sample Range:
(leave blank to include all observations)

From:

[Select module]

Load Module

- Home Page
- Equation Plotter
- Time Series Analysis (new)
- Time Series Analysis (old)
- Multiple Regression (new)
- Multiple Regression (old)
- Descriptive Statistics
- Statistical Distributions
- Hypothesis Testing
- Statistics Education

- Academic citations
- Computations Archive
- Search Computations
- R Project
- FAQ
- About Wessa.net

Data for the reproduced computations

Can paste in data for new analysis e.g. from excel

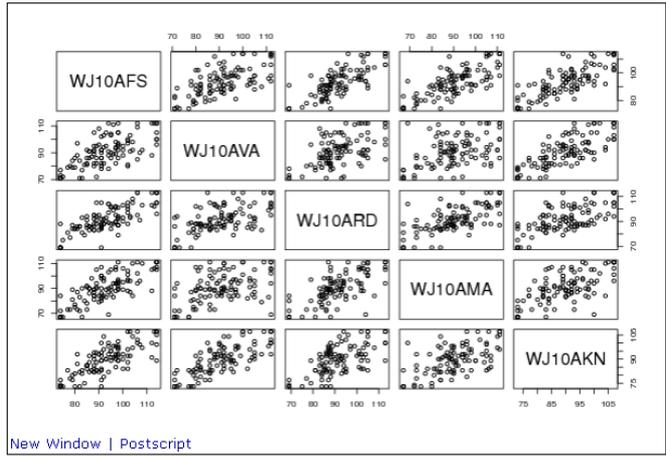
Find: SPSS Reached end of page, continued from top

Done zotero

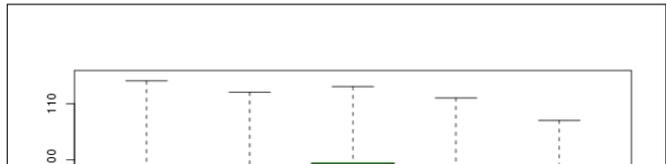
WJ10AKN	73	83	90	96	107
---------	----	----	----	----	-----

Boxplot Notches			
Variable	lower bound	median	upper bound
WJ10AFS	89.99	92	94.01
WJ10AVA	88.6	91	93.4
WJ10ARD	87.91	90	92.09
WJ10AMA	87.83	90	92.17
WJ10AKN	87.98	90	92.02

Boxplot Means		
Variable	trimmed mean	unbiased SD
WJ10AFS	93.09	10.45
WJ10AVA	90.72	11.14
WJ10ARD	91.53	10.4
WJ10AMA	90.35	11.84
WJ10AKN	89.76	9.22



New Window | Postscript

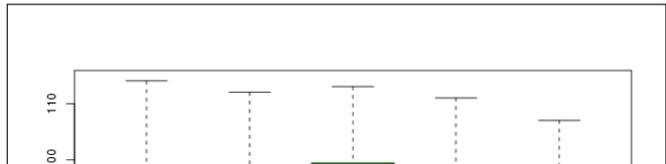
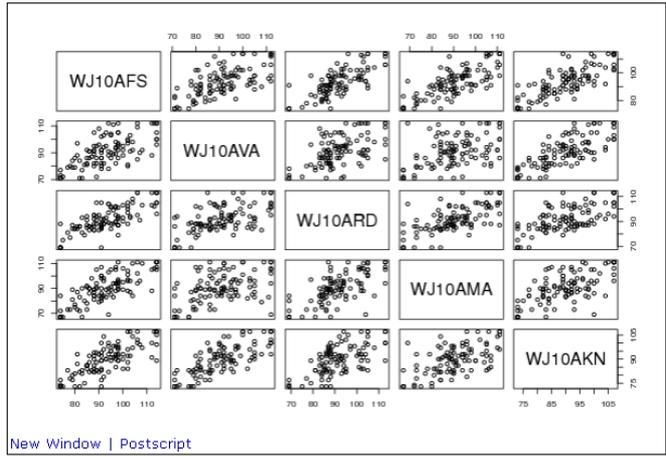


Shows the reproduced analysis.

WJ10AKN	73	83	90	96	107
---------	----	----	----	----	-----

Boxplot Notches			
Variable	lower bound	median	upper bound
WJ10AFS	89.99	92	94.01
WJ10AVA	88.6	91	93.4
WJ10ARD	87.91	90	92.09
WJ10AMA	87.83	90	92.17
WJ10AKN	87.98	90	92.02

Boxplot Means		
Variable	trimmed mean	unbiased SD
WJ10AFS	93.09	10.45
WJ10AVA	90.72	11.14
WJ10ARD	91.53	10.4
WJ10AMA	90.35	11.84
WJ10AKN	89.76	9.22



- Shows the reproduced analysis.
- Computation is recomputed externally by wessa.net R servers.

CARE Data - Boxplot and trimmed Means - Free Statistics and Forecasting Software (Calculators) v.1.1.23-r4 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.wessa.net/lan.holliday/rwasp_CARE Data Boxplot.wasp

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools... TinyURL! Writers and Artists Home Journal of Vision - Opti... Customize Links Journal of Statistical S...

Search Mail Answers Dating Y! Mobile Sign in

Introduction of a social... (application/pdf Object) (Untitled) Blog & Share Statistic... Blog & Share Statistic... Blackboard Academic ... Blog & Share Statistic... CARE Data - Boxplo...

WJ10AKN	73	83	90	96	107
---------	----	----	----	----	-----

Variable	lower bound	median	upper bound
WJ10AFS	89.99	92	94.01
WJ10AVA	88.6	91	93.4
WJ10ARD	87.91	90	92.09
WJ10AMA	87.83	90	92.17
WJ10AKN	87.98	90	92.02

Variable	trimmed mean	unbiased SD
WJ10AFS	93.09	10.45
WJ10AVA	90.72	11.14
WJ10ARD	91.53	10.4
WJ10AMA	90.35	11.84
WJ10AKN	89.76	9.22

New Window | Postscript

Find: SPSS Next Previous Highlight all Match case Reached end of page, continued from top

Done

zotero

- Shows the reproduced analysis.
- Computation is recomputed externally by wessa.net R servers.
- Enables modification and exploration using controls on the page.

0

Chart options

Width:	600
Height:	400
Title:	CARE AGE 7 DATA
Label y-axis:	Test Scores
Label x-axis:	CARE Variable Names

R Code

```
#'GNU S' R Code compiled by R2WASP v. 1.0.44 ()
#Author: Dr. Ian E. Holliday
#To cite this work: Ian E. Holliday, 2009, CARE BoxPlot
and Descriptives (v1.0.1) in Free Statistics Software
(v$_version), Office for Research Development and
Education, URL http://www.wessa.net/Ian.Holliday
/rwasp_varia1.wasp/
#Source of accompanying publication:
#Technical description:
par1 <- as.numeric(par1) #colour
par2<- as.logical(par2) # Notches ?
par3<-as.numeric(par3) # % trim
if(par3>45){par3<-45;warning('trim limited to 45%')}
if(par3<0){par3<-0;warning('negative trim makes no
sense. Trim is zero.')}
lotrm<-as.integer(length(y[,,])*par3/100)+1
hitrm<-as.integer(length(y[,,])*par3/100)
y1<-array(dim=c(dim(y)[1], hitrm-lotrm+1),
dimnames=list(dimnames(y)[[1]], 1:(hitrm-lotrm+1) ))
for(i in 1:dim(y)[1]){
tmp<-order(y[,i])
y1[,i]~ y[, tmp[lotrm:hitrm] ]
}
bitmap(file='test2.png')
pairs(t(y))
```

Compute

Summary of computational transaction

Raw Input	view raw input (R code)
Raw Output	view raw output of R engine
Computing time	1 seconds
R Server	'Gwilym Jenkins' @ 72.249.127.135

Boxplot statistics

Variable	lower whisker	lower hinge	median	upper hinge	upper whisker
WJ10AFS	74	86	92	99	114
WJ10AVA	71	82	91	97.5	112
WJ10ARD	69	86	90	99.5	113

- Code is shown and can be modified or re-used in new modules.

CARE Data - Boxplot and Timmed Means - Free Statistics and Forecasting Software (Calculators) v.1.1.23-r4 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.wessa.net/Ian.Holliday/rwasp_CARE Data Boxplot.wasp

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools... TinyURL! Writers and Artists Home Journal of Vision - Opti... Customize Links Journal of Statistical S...

Search Mail Answers Dating Y! Mobile Sign in

Introduction of a social... (application/pdf Object) (Untitled) Blog & Share Statistic... Blog & Share Statistic... Blackboard Academic... Blog & Share Statistic... CARE Data - Boxplo...

0

Chart options	
Width:	600
Height:	400
Title:	CARE AGE 7 DATA
Label y-axis:	Test Scores
Label x-axis:	CARE Variable Names

R Code

```
#'GNU S' R Code compiled by R2WASP v. 1.0.44 ()
#Author: Dr. Ian E. Holliday
#To cite this work: Ian E. Holliday, 2009, CARE BoxPlot
and Descriptives (v1.0.1) in Free Statistics Software
(v$_version), Office for Research Development and
Education, URL http://www.wessa.net/Ian.Holliday
/rwasp_varia1.wasp/
#Source of accompanying publication:
#Technical description:
par1 <- as.numeric(par1) #colour
par2<- as.logical(par2) # Notches ?
par3<-as.numeric(par3) # % trim
if(par3>45){par3<-45;warning('trim limited to 45%')}
if(par3<0){par3<-0;warning('negative trim makes no
sense. Trim is zero.')}
lotrm<-as.integer(length(y[,1])*par3/100)+1
hitrm<-as.integer(length(y[,1])*par3/100)
y1<-array(dim=c(dim(y)[1], hitrm-lotrm+1),
dimnames=list(dimnames(y)[[1]], 1:(hitrm-lotrm+1) ))
for(i in 1:dim(y)[1]){
tmp<-order(y[i,])
y1[i,]<- y[i, tmp[lotrm:hitrm]]
}
bitmap(file='test2.png')
pairs(t(y))
```

Summary of computational transaction	
Raw Input	view raw input (R code)
Raw Output	view raw output of R engine
Computing time	1 seconds
R Server	'Gwilym Jenkins' @ 72.249.127.135

Boxplot statistics					
Variable	lower whisker	lower hinge	median	upper hinge	upper whisker
WJ10AFS	74	86	92	99	114
WJ10AVA	71	82	91	97.5	112
WJ10ARD	69	86	90	99.5	113

Find: SPSS Next Previous Highlight all Match case Reached end of page, continued from top

Done

zotero

- Code is shown and can be modified or re-used in new modules.
- Blogged Analysis reproduced by re-computing.

CARE Data - Boxplot and Timmed Means - Free Statistics and Forecasting Software (Calculators) v.1.1.23-r4 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.wessa.net/Ian.Holliday/rwasp_CARE Data Boxplot.wasp

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools... TinyURL! Writers and Artists Home Journal of Vision - Opti... Customize Links Journal of Statistical S...

Search Mail Answers Dating Y! Mobile Sign in

Introduction of a social... (application/pdf Object) (Untitled) Blog & Share Statistic... Blog & Share Statistic... Blackboard Academic... Blog & Share Statistic... CARE Data - Boxplo...

0

Chart options	
Width:	600
Height:	400
Title:	CARE AGE 7 DATA
Label y-axis:	Test Scores
Label x-axis:	CARE Variable Names

R Code

```
#'GNU S' R Code compiled by R2WASP v. 1.0.44 ()
#Author: Dr. Ian E. Holliday
#To cite this work: Ian E. Holliday, 2009, CARE BoxPlot
and Descriptives (v1.0.1) in Free Statistics Software
(v$_version), Office for Research Development and
Education, URL http://www.wessa.net/Ian.Holliday
/rwasp_varia1.wasp/
#Source of accompanying publication:
#Technical description:
par1 <- as.numeric(par1) #colour
par2<- as.logical(par2) # Notches ?
par3<-as.numeric(par3) # % trim
if(par3>45){par3<-45;warning('trim limited to 45%')}
if(par3<0){par3<-0;warning('negative trim makes no
sense. Trim is zero.')}
lotrm<-as.integer(length(y[,1])*par3/100)+1
hitrm<-as.integer(length(y[,1])*(100-par3)/100)
y1<-array(dim=c(dim(y)[1], hitrm-lotrm+1),
dimnames=list(dimnames(y)[[1]], 1:(hitrm-lotrm+1) ))
for(i in 1:dim(y)[1]){
tmp<-order(y[i,])
y1[i,]<- y[i, tmp[lotrm:hitrm]]
}
bitmap(file='test2.png')
pairs(t(y))
```

Summary of computational transaction	
Raw Input	view raw input (R code)
Raw Output	view raw output of R engine
Computing time	1 seconds
R Server	'Gwilym Jenkins' @ 72.249.127.135

Boxplot statistics					
Variable	lower whisker	lower hinge	median	upper hinge	upper whisker
WJ10AFS	74	86	92	99	114
WJ10AVA	71	82	91	97.5	112
WJ10ARD	69	86	90	99.5	113

Find: SPSS Next Previous Highlight all Match case Reached end of page, continued from top

Done

zotero

- Code is shown and can be modified or re-used in new modules.
- Blogged Analysis reproduced by re-computing.
- Changes to analysis computed then blogged.

Computations are “blogged” (not archived)

http://www.freestats.org/) where it is permanently archived for reference purposes. In addition visitors of the Blog can Discuss, Reproduce, and Reuse all Statistical Computations in the archive.

Submit your Statistical Computation to the FreeStatistics.org Archive	
Field	Value
Title (optional, meaningful title)	this is my title
Keywords (optional, comma delimited list)	statistics, assignment 5, hypothesis testing, any other keyword
Your Comments (optional, any meaningful text)	I computed this hypothesis test to answer question 3 in assignment 5
E-mail (optional, private - this is required if you want to edit/delete the post at a later time)	patrick@wessa.net
Type of Access (optional, do you want to grant everyone access to your archived computation?)	Public (anybody can access my computation)
Moratorium date (enter the moratorium date - only needed if 'Moratorium' is selected in 'Type of Access')	YYYY-MM-DD
Captcha <small>captcha</small>	

Done

Multiple Regression (old)
Descriptive Statistics
Statistical Distributions
Hypothesis Testing
Statistics Education

Academic citations
Computations Archive
Search Computations
R Project
FAQ
About Wessa.net
Powered by Linux

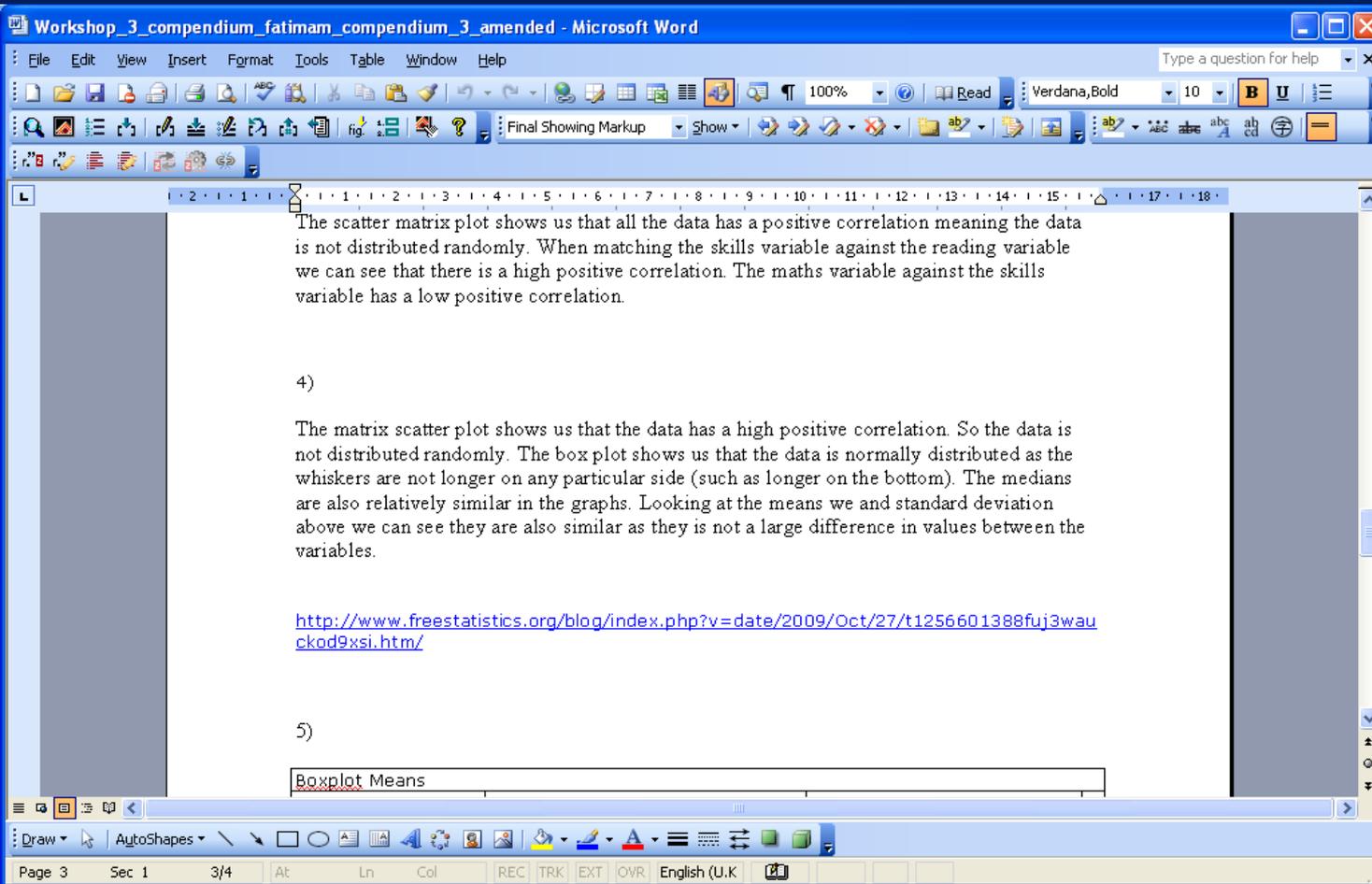
Server status page
History list

Google™

Web wessas.net

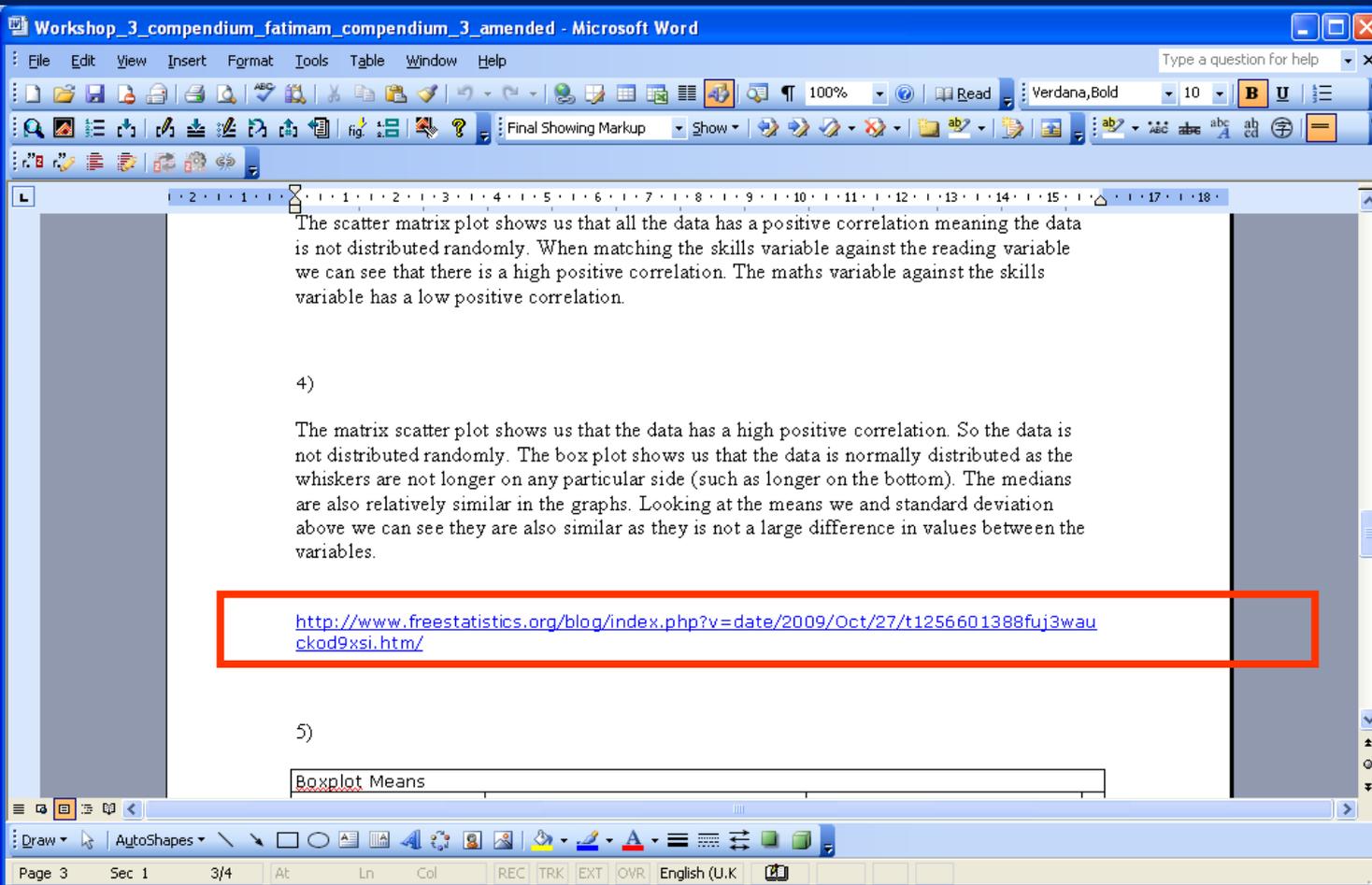
Search

Student compendium



- Produced in Word or Oo

Student compendium



- Produced in Word or Oo
- Student's provide links to blogs to support stats interpretation

Blackboard Academic Suite - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bb.aston.ac.uk/webapps/portal/frameset.jsp?tab_id=_2_1&url=%2fwebapps%2fblack

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools...

Y! Search Mail Answers Dating Y! Mobile Sign

Introduction of a social construct... (application/pdf Object) (Untitled) Blog & Share

Aston University Home Help Logout

My Welcome Page Modules Library Matters

(2009-10 PY2224) ADVANCED STATISTICS (2009 PY2224) > EXTERNAL LINKS



External Links



Peer Review

Click [here](#) to access the Peer Review application.

Surveys:

- Click [here](#) to take the *Attitudes Towards Thinking and Learning Survey*
- Click [here](#) to take the *Academic Motivation Survey*
- CSUQ+ survey (available soon)
- COLLES survey (available soon)

Some notes:

- **CAUTION:** Multiple tabs within one browser (or multiple browsers open at the same time) **should NOT** cross-refer between your reviews.
- The *default settings* of Internet Explorer are too restrictive to use the Peer Review application. It may
- So far, no difficulties were found in the following browsers: FireFox, Chrome, Safari, Epiphany, Sear
- Helpdesk: please, do not hesitate report any questions, suggestions, or complaints in the Discussi
- Surveys: during the course you will be prompted to submit some surveys. The purpose of these sur we are interested only in your opinion. Please be assured that your responses will be treated with a



Reviewing Rubric Guidelines

[review_rubrics.doc](#) (24.5 kb)



Review Deadline Shows in Red

To confirm the announcement at the end of last year regarding the submission reviews for week 11 Patrick

"The deadline for the review about the last workshop was set for 2009-12-22 (my mistake). However, the sy in red but I made sure that this has no impact on the review statistics/reporting whatsoever."

- Students upload to external review site

Blackboard Academic Suite - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bb.aston.ac.uk/webapps/portal/frameset.jsp?tab_id=_2_1&url=%2fwebapps%2fblack

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools...

Y! Search Mail Answers Dating Y! Mobile Sign

Introduction of a social construct... (application/pdf Object) (Untitled) Blog & Share

Aston University Home Help Logout

My Welcome Page Modules Library Matters

Announcements
Module Information
Staff Information
Communication
Tools
Discussion Board
Reading Lists
Lectures and
Practicals Handouts
External Links
Assignments

Tools
Course Map
Control Panel
Refresh
Detail View

(2009-10 PY2224) ADVANCED STATISTICS (2009 PY2224) > EXTERNAL LINKS

External Links

Peer Review

Click [here](#) to access the Peer Review application.

Surveys:

- Click [here](#) to take the *Attitudes Towards Thinking and Learning Survey*
- Click [here](#) to take the *Academic Motivation Survey*
- CSUQ+ survey (available soon)
- COLLES survey (available soon)

Some notes:

- **CAUTION:** Multiple tabs within one browser (or multiple browsers open at the same time) should NOT cross-refer between your reviews.
- The *default settings* of Internet Explorer are too restrictive to use the Peer Review application. It may
- So far, no difficulties were found in the following browsers: FireFox, Chrome, Safari, Epiphany, Sear
- Helpdesk: please, do not hesitate report any questions, suggestions, or complaints in the Discussi
- Surveys: during the course you will be prompted to submit some surveys. The purpose of these surwe are interested only in your opinion. Please be assured that your responses will be treated with a

Reviewing Rubric Guidelines

[review_rubrics.doc](#) (24.5 kb)

Review Deadline Shows in Red

To confirm the announcement at the end of last year regarding the submission reviews for week 11 Patrick

"The deadline for the review about the last workshop was set for 2009-12-22 (my mistake). However, the sy in red but I made sure that this has no impact on the review statistics/reporting whatsoever."

- Students upload to external review site
- We (attempt to!) collect student survey data.

Blackboard Academic Suite - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bb.aston.ac.uk/webapps/portal/frameset.jsp?tab_id=_2_1&url=%2fwebapps%2fblack

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools...

Search Mail Answers Dating Y! Mobile Sign

Introduction of a social construct... (application/pdf Object) (Untitled) Blog & Share

Aston University Home Help Logout

My Welcome Page Modules Library Matters

Announcements
Module Information
Staff Information
Communication
Tools
Discussion Board
Reading Lists
Lectures and
Practicals Handouts
External Links
Assignments

Tools
Course Map
Control Panel
Refresh
Detail View

(2009-10 PY2224) ADVANCED STATISTICS (2009 PY2224) > EXTERNAL LINKS

External Links

Peer Review
Click [here](#) to access the Peer Review application.

Surveys:

- Click [here](#) to take the *Attitudes Towards Thinking and Learning Survey*
- Click [here](#) to take the *Academic Motivation Survey*
- CSUQ+ survey (available soon)
- COLLES survey (available soon)

Some notes:

- CAUTION: Multiple tabs** within one browser (or multiple browsers open at the same time) **should NOT** cross refer between your reviews.
- The *default settings* of Internet Explorer are too restrictive to use the Peer Review application. It may
- So far, no difficulties were found in the following browsers: FireFox, Chrome, Safari, Epiphany, Sear
- Helpdesk: please, do not hesitate report any questions, suggestions, or complaints in the Discussi
- Surveys: during the course you will be prompted to submit some surveys. The purpose of these surv we are interested in your opinion. Please be assured that your responses will be treated with a

Reviewing Rubric Guidelines
[review_rubrics.doc](#) (24.5 kb)

Review Deadline Shows in Red
To confirm the announcement at the end of last year regarding the submission reviews for week 11 Patrick
The deadline for the review about the last workshop was set for 2009-12-22 (my mistake). However, the sy in red but I made sure that this has no impact on the review statistics/reporting whatsoever."

- Students upload to external review site
- We (attempt to!) collect student survey data.
- Provide feedback guidance and support messages

Blackboard Academic Suite - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bb.aston.ac.uk/webapps/portal/frameset.jsp?tab_id=_2_1&url=%2fwebapps%2fblack

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools...

Search Mail Answers Dating Y! Mobile Sign

Introduction of a social construct... (application/pdf Object) (Untitled) Blog & Share

Aston University Home Help Logout

My Welcome Page Modules Library Matters

(2009-10 PY2224) ADVANCED STATISTICS (2009 PY2224) > EXTERNAL LINKS

External Links

Peer Review
Click [here](#) to access the Peer Review application.

Surveys:

- Click [here](#) to take the *Attitudes Towards Thinking and Learning Survey*
- Click [here](#) to take the *Academic Motivation Survey*
- CSUQ+ survey (available soon)
- COLLES survey (available soon)

Some notes:

- CAUTION: Multiple tabs** within one browser (or multiple browsers open at the same time) **should NOT** cross refer between your reviews.
- The *default settings* of Internet Explorer are too restrictive to use the Peer Review application. It may
- So far, no difficulties were found in the following browsers: FireFox, Chrome, Safari, Epiphany, Sear
- Helpdesk: please, do not hesitate report any questions, suggestions, or complaints in the Discussi
- Surveys: during the course you will be prompted to submit some surveys. The purpose of these surv we are interested in your opinion. Please be assured that your responses will be treated with a

Reviewing Rubric Guidelines
[review_rubrics.doc](#) (24.5 kb)

Review Deadline Shows in Red
To confirm the announcement at the end of last year regarding the submission reviews for week 11 Patrick
The deadline for the review about the last workshop was set for 2009-12-22 (my mistake). However, the sy in red but I made sure that this has no impact on the review statistics/reporting whatsoever."

- Students upload to external review site
- We (attempt to!) collect student survey data.
- Provide feedback guidance and support messages

Blackboard Academic Suite - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bb.aston.ac.uk/webapps/portal/frameset.jsp?tab_id=_2_1&url=%2fwebapps%2fblack

Most Visited Getting Started Latest Headlines Mozilla Firefox Start P... PLoS ONE Alerts: Neur... Comments on My tools...

Search Mail Answers Dating Y! Mobile Sign

Introduction of a social construct... (application/pdf Object) (Untitled) Blog & Share

Aston University Home Help Logout

My Welcome Page Modules Library Matters

(2009-10 PY2224) ADVANCED STATISTICS (2009 PY2224) > EXTERNAL LINKS

External Links

Peer Review
Click [here](#) to access the Peer Review application.

Surveys:

- Click [here](#) to take the *Attitudes Towards Thinking and Learning Survey*
- Click [here](#) to take the *Academic Motivation Survey*
- CSUQ+ survey (available soon)
- COLLES survey (available soon)

Some notes:

- CAUTION: Multiple tabs** within one browser (or multiple browsers open at the same time) **should NOT** cross refer between your reviews.
- The *default settings* of Internet Explorer are too restrictive to use the Peer Review application. It may
- So far, no difficulties were found in the following browsers: FireFox, Chrome, Safari, Epiphany, Sear
- Helpdesk: please, do not hesitate report any questions, suggestions, or complaints in the Discussi
- Surveys: during the course you will be prompted to submit some surveys. The purpose of these surv we are interested in your opinion. Please be assured that your responses will be treated with a

Reviewing Rubric Guidelines
[review_rubrics.doc](#) (24.5 kb)

Review Deadline Shows in Red
To confirm the announcement at the end of last year regarding the submission reviews for week 11 Patrick
The deadline for the review about the last workshop was set for 2009-12-22 (my mistake). However, the sy in red but I made sure that this has no impact on the review statistics/reporting whatsoever."

- Students upload to external review site
- We (attempt to!) collect student survey data.
- Provide feedback guidance and support messages



Here you can view the list of all workshops that your instructors have created for you. Each workshop requires you to: (1) submit a fully Reviews about the Compendia that have been submitted by other students.

Nr.	Workshop Title	Submission Deadline	Submitted	Review Deadline	Reviews submitted
1	Workshop 1	2009-10-13 16:00	yes	2009-10-20 16:00	5/7
Using Histograms & QQplots to graphically investigate sample distributions					
Compendium		Size	Date	Reviews received	Command
Compendium 1		178688	2009-10-19 18:03	4/7	[Details]
ID		Size	Date	Review submitted	Command
a-082235970		32768	2009-10-12 17:33	2009-10-20 15:17	[Details]
a-082666705					
a-099033411		152064	2009-10-18 23:31		[Review]
a-080625555		57344	2009-10-11 13:44	2009-10-20 15:37	[Details]
a-083415793		74240	2009-10-13 08:35	2009-10-20 15:48	[Details]
a-081745878		67653	2009-10-12 20:17	2009-10-20 15:59	[Details]
a-082152183		40448	2009-10-13 10:39	2009-10-20 16:12	[Details]
Nr.	Workshop Title	Submission Deadline	Submitted	Review Deadline	Reviews submitted
2	Compendium - week 2	2009-10-20 16:00	yes	2009-10-27 16:00	4/7
Assessing Data Quality					
Compendium		Size	Date	Reviews received	Command
Week 2 Compendium		246784	2009-10-20 16:17	5/7	[Details]
ID		Size	Date	Review submitted	Command
a-082219006		206848	2009-10-19 15:22	2009-10-26 22:21	[Details]
a-070907856		190464	2009-10-20 13:39	2009-10-26 22:51	[Details]
a-081836936		147968	2009-10-19 16:43	2009-10-26 23:50	[Details]
a-099064910		178176	2009-10-29 22:31		[Review]
a-082235970					
a-083367997					
a-082047915		216576	2009-10-20 13:27	2009-10-27 00:40	[Details]
Nr.	Workshop Title	Submission Deadline	Submitted	Review Deadline	Reviews submitted
3	Compendium - week 3	2009-10-27 16:00	yes	2009-11-03 16:00	5/7
Carolina educational study dataset (CARE)					
Compendium		Size	Date	Reviews received	Command
Compendium Week 3		274944	2009-10-27 00:58	6/7	[Details]
ID		Size	Date	Review submitted	Command
a-083507353		132608	2009-10-26 15:59	2009-11-01 23:42	[Details]

- Student reviews collated and shared anonymously for peer feedback.
- Stats tracked individually

Data captured from students is analyzed within the R framework too.

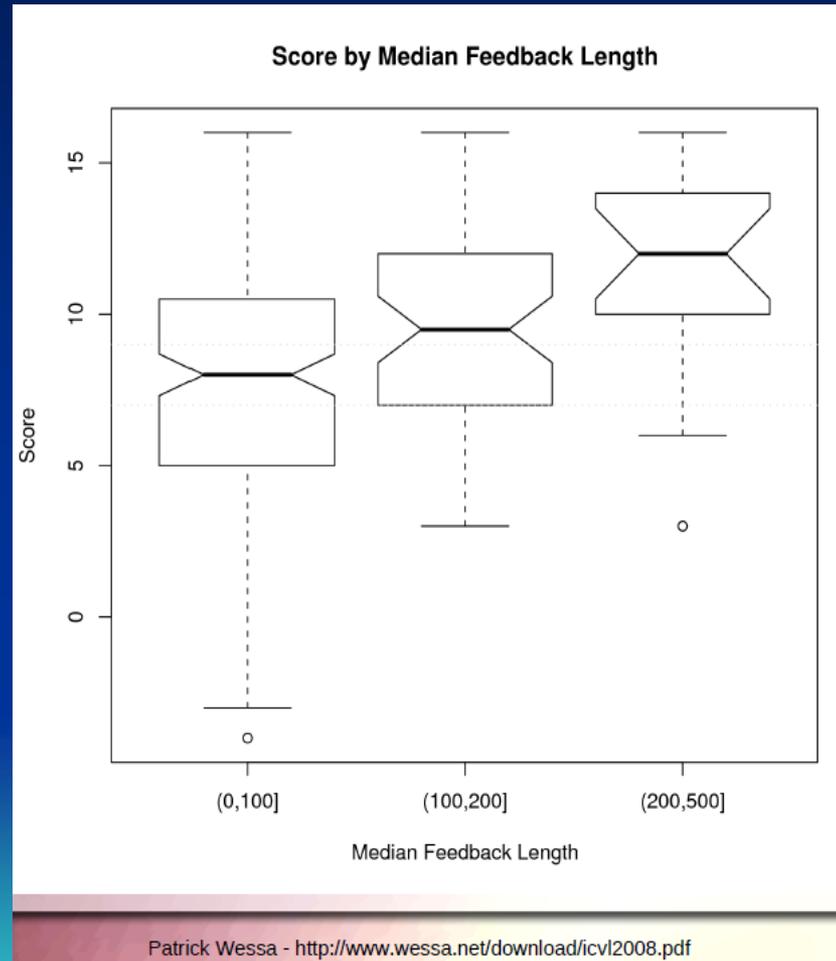
ID	Median Review Time	Number of Feedback Messages	Feedback Messages per Compendium	Average Feedback Length	Levenshtein per message	Levenshtein per criterion	Messages with Hyperlinks
a-099035389	22	134	3.44	335.12	107.89	60.51	1
a-060610188	7	112	3.29	143.8	68.94	39.05	0
a-081954632	2	92	2.42	88.7	62.41	69.6	0
a-082235970	9	115	3.29	244.97	97.89	53.34	0
a-082666705	13	94	3.13	289.48	87.22	75.79	0
a-099033411	15	137	3.43	276.93	105.38	41.24	1
a-080625555	8	112	3.03	174.31	76.19	48.82	0
a-083415793	8	74	2.47	332.74	104.79	70.21	0
a-081745878	12	101	2.97	268.43	109.41	63.59	0
a-082152183	22	155	4.08	397.95	164.27	116.09	0
a-071330161	10	63	2.17	355.29	98.84	72.67	0
a-081749120	7	110	2.89	135.95	67.68	56.59	0
a-082700353	17	128	3.37	531.25	169.02	129.43	0
a-083205954	21	118	3.37	515.73	189.34	123.26	1
a-099041863	5	132	3.67	197.41	91.1	72.53	0
a-085544789	0	0	0	0	0	0	0
a-083822016	6	68	3.4	124.4	71.46	51.17	0
a-082438124	6	100	3.03	167.91	74.16	56.85	0
a-081276394	6	100	2.78	145.83	77.01	77.74	0
a-081943290	11	97	2.69	257.55	89.04	62.56	0
a-089006164	13	87	2.64	478.66	156.42	71.49	1
a-099010906	7	133	3.33	212.19	78.98	51.86	0
a-081667846	6	96	3.43	176.07	73.2	53.06	0
a-082122441	14	130	3.51	184.32	76.78	67.21	0
a-081997215	15	162	4.05	319	109.44	48.62	0
a-081393613	8	130	2.89	157.64	80.35	69.74	0

Data captured from students is analyzed within the R framework too.

This shows per student performance on several metrics e.g. feedback message length

ID	Median Review Time	Number of Feedback Messages	Feedback Messages per Compendium	Average Feedback Length	Levenshtein per message	Levenshtein per criterion	Messages with Hyperlinks
a-099035389	22	134	3.44	335.12	107.89	60.51	1
a-060610188	7	112	3.29	143.8	68.94	39.05	0
a-081954632	2	92	2.42	88.7	62.41	69.6	0
a-082235970	9	115	3.29	244.97	97.89	53.34	0
a-082666705	13	94	3.13	289.48	87.22	75.79	0
a-099033411	15	137	3.43	276.93	105.38	41.24	1
a-080625555	8	112	3.03	174.31	76.19	48.82	0
a-083415793	8	74	2.47	332.74	104.79	70.21	0
a-081745878	12	101	2.97	268.43	109.41	63.59	0
a-082152183	22	155	4.08	397.95	164.27	116.09	0
a-071330161	10	63	2.17	355.29	98.84	72.67	0
a-081749120	7	110	2.89	135.95	67.68	56.59	0
a-082700353	17	128	3.37	531.25	169.02	129.43	0
a-083205954	21	118	3.37	515.73	189.34	123.26	1
a-099041863	5	132	3.67	197.41	91.1	72.53	0
a-085544789	0	0	0	0	0	0	0
a-083822016	6	68	3.4	124.4	71.46	51.17	0
a-082438124	6	100	3.03	167.91	74.16	56.85	0
a-081276394	6	100	2.78	145.83	77.01	77.74	0
a-081943290	11	97	2.69	257.55	89.04	62.56	0
a-089006164	13	87	2.64	478.66	156.42	71.49	1
a-099010906	7	133	3.33	212.19	78.98	51.86	0
a-081667846	6	96	3.43	176.07	73.2	53.06	0
a-082122441	14	130	3.51	184.32	76.78	67.21	0
a-081997215	15	162	4.05	319	109.44	48.62	0
a-081393613	8	130	2.89	157.64	80.35	69.74	0

Exam Results and Feedback Effort



Experiment on VLE Design

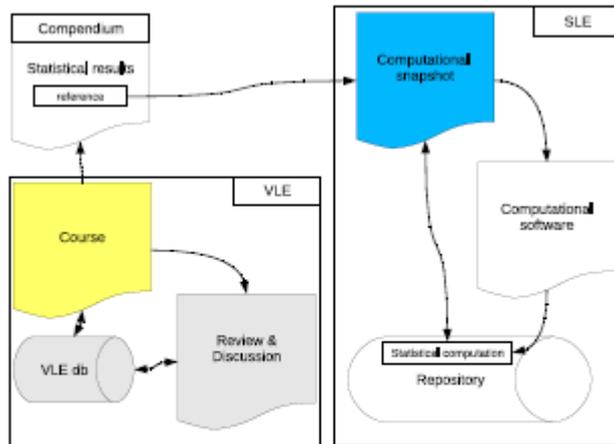


Figure 4. System Design — Year 0

Traditional VLE

Experiment on VLE Design

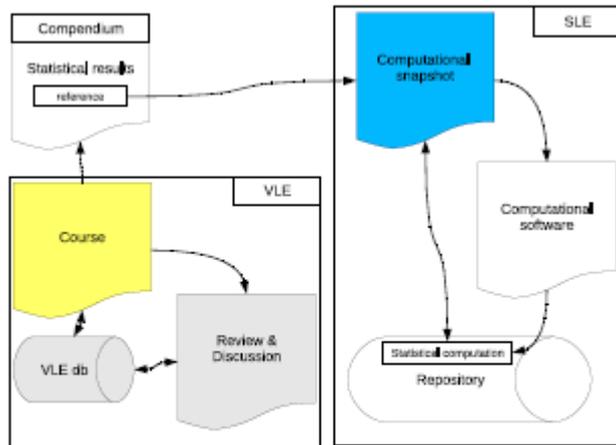


Figure 4. System Design — Year 0

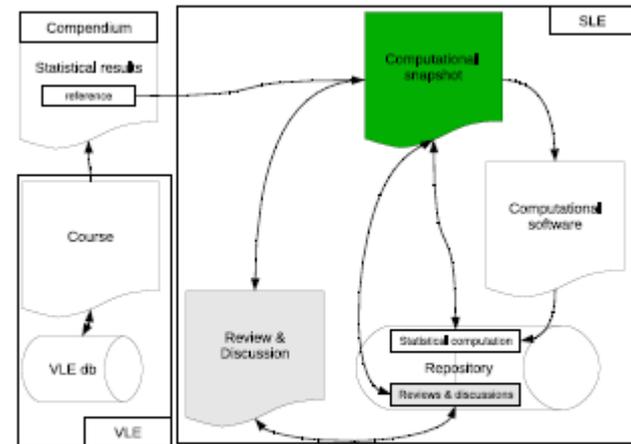


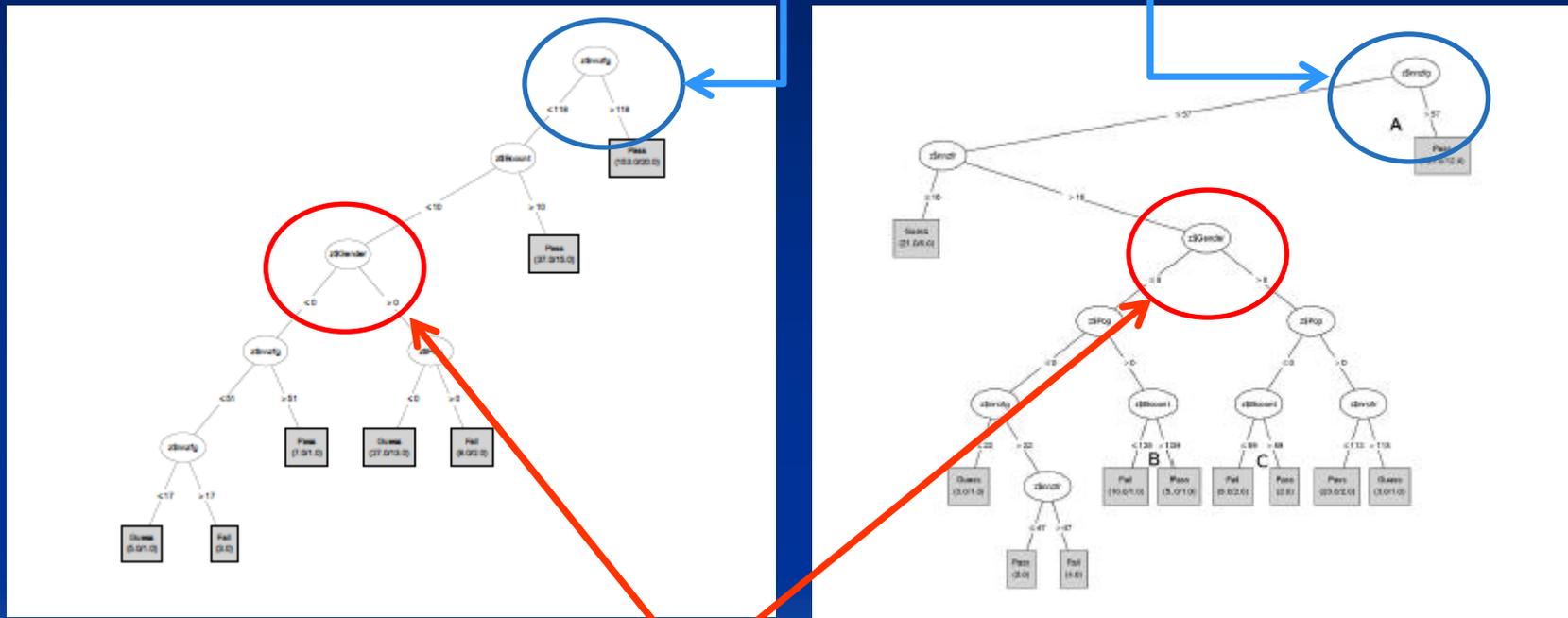
Figure 5. System Design — Year 1

Traditional VLE

Statistical LE

Effect of VLE DDesign

Feedback messages rate is dominant variable: threshold for pass is 118 in year 1 vs. 57 in year 2 -> large increase in efficiency



A gender bias in year 1 is eliminated in the new design

Issues

- Course development takes a lot of effort
 - But a core of material is now available



Issues

- Course development takes a lot of effort
 - But a core of material is now available
- Assessment takes a lot of effort
 - But on-going feedback important feature



Issues

- Course development takes a lot of effort
 - But a core of material is now available
- Assessment takes a lot of effort
 - But on-going feedback important feature
- Student resistance to workload
 - Actually well-matched to course requirement.



Issues

- Course development takes a lot of effort
 - But a core of material is now available
- Assessment takes a lot of effort
 - But on-going feedback important feature
- Student resistance to workload
 - Actually well-matched to course requirement.
- Perceived professional status of SPSS vs. R
 - Point is to learn statistics; open source tools



End of Presentation

