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Realignment of Functions Within CITC

By John Hooper, Acting Vice President for Information Technology and CIO for UNT, Deputy CIO for the UNT System

In April I announced a realignment of functions within CITC. The resignation of Tom McElwee presented us the opportunity to examine our organization and consider how we want to be organized going forward. Tom McElwee's organization and the components within it were working well but his departure gave us the opportunity to consider how we might align some of our services.

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Summer Hours

By Claudia Lynch, Benchmarks Online Editor

The 5W1 and 8W1 semesters have ended, 5W2 has started and the SUM and 10W classes are in full swing. Following are the hours for Computing and Information Technology Center-managed facilities during this time period and on through the summer.

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EDUCAUSE Annual Conference: Domains and Themes

By Claudia Lynch, Benchmarks Online Editor

There's *still* time to register for the EDUCAUSE 2011 annual conference. It is being held in Philadelphia, Pennsylvania this year (October 18–21; Online: October 19–21).

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Today's Cartoon

By the Numbers

Communications % of usage (2010):

- UNT: 63%
- System: 7%
- HSC: 20%
- Dallas: 10%
- Totals: 100%

Click on the link above for an information age laugh.

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Realignment of Functions Within CITC

By John Hooper, Acting Vice President for Information Technology and CIO for UNT, Deputy CIO for the UNT System

In April I announced a realignment of functions within CITC. The resignation of Tom McElwee presented us the opportunity to examine our organization and consider how we want to be organized going forward. Tom McElwee's organization and the components within it were working well but his departure gave us the opportunity to consider how we might align some of our services. The following organizational changes were put into effect:

1. The Imaging Team, and the Distance Learning Team report to Robert Jones, leader of the AIS Tools and User Services organization.

2. The Messaging and Directory Service team was be renamed Enterprise Collaboration Services and reports to Joe Adamo.

3. The SharePoint team, and Central Web Support report to the Enterprise Collaboration Services organization.

At the time I indicated we would be considering other possible organization changes based on the direction of IT technologies, shared services, similarities in operational approaches, recent IT study organizational structure recommendations, and synergies between parts of the organization. Based on those considerations, I would like to announce that the vacant position for the **Director of Enterprise Systems Technical Services** will be posted for employment with additional organization changes associated with this position.

Preparing for shared services

In preparation for shared services and with a move toward infrastructure as a shared utility, two teams will report to the Director of Enterprise Systems Technical Services:

1. The **Oracle Database Administration Team** - This team, led by Eric Duchemin, will be renamed to reflect that they are now providing SQL Server services in addition to Oracle. This move recognizes that the team provides database services beyond its mission with EIS or even enterprise applications and its development as a more global utility.

2. The **Operations and Infrastructure Support Team** - This team, led by Steve Vocelka, provides data center management services across multiple data centers. This move will more closely align these activities with the other technology infrastructure services provided by the Enterprise Systems Technical Services division.

Both of the teams involved in this realignment provide outstanding service. This will not change the services they provide or the level of service you have become accustomed to receiving from them.

Finally, I want to thank Robert Jones and Charlotte Russell for their excellent direction of the Oracle Database Administration and the Operations and Infrastructure Support teams.

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Summer Hours

By Claudia Lynch, *Benchmarks Online* Editor

The 5W1 and 8W1 semesters have ended, 5W2 has started and the SUM and 10W classes are in full swing. Following are the hours for Computing and Information Technology Center-managed facilities during this time period and on through the summer. The **Helpdesk** plans, at this point, to be open their normal hours throughout the remainder of the summer.

- **Data Management Services** will be closed when the University is closed and will otherwise maintain their normal hours over the summer.

- The **ACS General Access/Adaptive Lab** (SYMR 104) will keep the following hours this summer:

  Saturday: 10 a.m.-9 p.m.
  Sunday: 1 p.m.-10 p.m.
  Monday - Thursday: 9 a.m.-10 p.m.
  Friday: 9 a.m.-9 p.m.

Hours for Other Campus Facilities

Check out the UNT Shuttle Summer Schedule here: http://www.unt.edu/transit/routes_sched.html

General Access Labs

- WILLIS normal schedule is 24hr/7 days a week).

- College of Information General Access Computer Lab (CI-GACLab) (B205):

  Summer Hours May 16 - August 12:
  Monday - Friday: 10 a.m. — 6 p.m.
  *Saturday: **Closed***
  *Sunday: **Closed***

  Closed:

  Semester Break: August 12 @ 6 p.m. - 24, Re-open August 25

- MUSIC:

Summer Hours: June 6 - August 12:

Monday - Thursday: 8 a.m. – 9 p.m.
Friday: 8 a.m. – 5 p.m.
Saturday: 10 a.m.-5 p.m.
Sunday: 1 p.m.-8 p.m.

- [PACS Computing Center](#) (College of Public Affairs and Community Service, Chilton Hall):

Summer Hours May 16 - August 12:
Monday - Thursday: 8 a.m. – 10 p.m.
Friday: 8 a.m. – 5 p.m.
Saturday: 8 a.m. - 8 p.m.
Sunday: Noon - 10 p.m.

Closed:

Semester Break: August 12 - 24, Re-open August 25

- [CVAD](#) (formerly SOVA):

Closed:

Semester Break: August 12 @ 5 P.M. - August 24, Re-open August 25

10 Week 1 (10W1) - this includes 5 Week 1 (5W1) and 5 Week 2 (5W2) June 6 - August 12:

Monday - Thursday: 8 a.m. – 10 p.m.
Friday: 8 a.m. – 5 p.m.
Saturday: Noon - 5 p.m.
Sunday: Noon - 8 p.m.

- [COE](#):

Maintain normal hours, Monday through Saturday. Closed on Sundays.
Closing: August 12; Reopen August 25 @ 7 a.m., resume normal hours.

- [COBA](#):

Business Lab (Downstairs – BA152)

Monday - Thursday: 8 a.m - 11:50 p.m.
Friday: 8 a.m. - 7:50 p.m.
Saturday: 8 a.m. - 7:50 p.m.
Sunday: Noon - 11:50 p.m.

General Access Lab (Upstairs – BA335)

Monday - Saturday: 8 a.m - 7:50 p.m.
Sunday: Noon - 7:50 p.m.

Curry Hall (Team Lab)

Monday - Thursday: 8 a.m - 11:30 p.m.
Friday & Saturday: 8 a.m. - 7:30 p.m.
Sunday: Noon - 11:30 p.m.

- [CAS](#):

  ### GAB 330

  10 Week 1 *(10W1) - this includes 5 Week 1 (5W1) and 5 Week 2 (5W2)* **June 6 - August 12**:

  Monday - Thursday: 8 a.m. – Midnight
  Friday: 8 a.m. – 5 p.m.
  Saturday: Noon - 8 p.m.
  Sunday: Noon - Midnight

  ### GAB 550

  10 Week 1 *(10W1) - this includes 5 Week 1 (5W1) and 5 Week 2 (5W2)* **June 6 - August 12**

  Monday - Friday: 8 a.m. – 5 p.m.
  Saturday: **Closed**
  Sunday: **Closed**

  ### Terrill 220

  10 Week 1 *(10W1) - this includes 5 Week 1 (5W1) and 5 Week 2 (5W2)* **June 6 - August 12**

  Monday - Thursday: 8 a.m. – 8 p.m.
  Friday: 8 a.m. – 5 p.m.
  Saturday: **Closed**
  Sunday: **Closed**

  ### Wooten 120

  10 Week 1 *(10W1) - this includes 5 Week 1 (5W1) and 5 Week 2 (5W2)* **June 6 - August 12**

  Monday - Thursday: 8 a.m. – 10 p.m.
  Friday: 8 a.m. – 5 p.m.
  Saturday: **Closed**
  Sunday: **Closed**

- **[Engineering](#) General Access Lab (CENGAL, englab@unt.edu, Discovery Park, B129, 891-6733)**

  Summer Hours: June 6 - August 12:

  Monday - Friday: 9 a.m. – 5 p.m.
  Saturday: **Closed**
  Sunday: **Closed**

  Closed:

  Semester Break*: August 12 @ 6 p.m. - 24, Re-open August 25*

Remember:

[Get your alerts fast in case of inclement weather](#)

Visit the Emergency Management website

City of Denton Residents, sign up for the CodeRED Emergency Notification System

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EDUCAUSE Annual Conference: Domains and Themes

By Claudia Lynch, *Benchmarks Online* Editor

There's *still* time to register for the EDUCAUSE 2011 annual conference. It is being held in Philadelphia, Pennsylvania this year (October 18–21; Online: October 19–21).

Click on the banner below to find out more information and/or to register. Early-bird rates are available through **September 20**.

Program Domains and Themes

There are eight Domains (formerly Tracks):

1. Enterprise Information Systems and Services

2. Information Security and Privacy Protection

3. Infrastructure

4. Leadership, Governance, and Management

5. Libraries, E-Research, and Digital Content

6. Support Strategies and Services

7. Teaching and Learning

8. Web and Media Development

There are thirty-four "themes" which are defined as "institutional challenges that can relate to more than one domain." Examples of some themes are:

1. Mobile services

2. Facilitating student success

3. Facilitating faculty success

4. Facilitating research success

Visit the link below for details about all the Domains and Themes:

http://www.educause.edu/E2011/Program/F2F/Terms

Unable to attend EDUCAUSE 2011 in Philadelphia this year?

Take advantage of the online event instead: http://www.educause.edu/E2011/Program/Online

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Today's Cartoon

From "Today's Cartoon by Randy Glasbergen", posted with special permission.
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By Dr. Philip Baczewski, Director of Academic Computing and User Services

A Century of IT

Last month marked another significant IT anniversary. IBM turned 100 years old, marking a century of development in information technology. From card sorters and typewriters to mainframes and supercomputers, IBM had a large role in how we organized and transmitted business information in the twentieth century.

IBM had a big influence on my professional career. Part of my early experience in the 1970's was using the University's IBM 360 mainframe to create programs that performed digital sound synthesis. (We could only get digital output and had to send a computer tape off to Cornell where they had digital to analog converters that could generate audio tapes.) In 1987, I joined UNT's Academic Computing Services as a mainframe system consultant, helping professors use IBM's technology to teach classes and pursue research. The rest, as they say, is history.

Because It's Time Network

While we don't generally think of IBM in relation to the development of the Internet, there were a number of ways IBM technology influenced or supported Internet technology. Back when the Internet was still a rather exclusive defense and research network, the most extensive wide area network serving higher education was called BITNET. BITNET was based on some IBM mainframe network protocols and was a store and forward network that ran over leased telephone lines connecting colleges and universities.

It was rather inexpensive to connect to BITNET, especially in an urban area, since all it took was paying for a phone line to connect to the nearest existing BITNET site. UNT's mainframe was a BITNET node and one of my first jobs in Academic Computing was to act as the BITNET educational representative supporting and promoting this new resource. This column was one result, starting it's existence as "The BITNET Connection."

BITNET supported e-mail, file transfer, live chat (BITNET Relay), and mailing lists. the LISTSERV mailing list software was developed on and for BITNET. While BITNET eventually succumbed to the dominance of the Internet and World Wide Web, it was many and academic's first exposure to online communication and collaboration. LISTSERV remains a useful tool on today's Internet even though the rest of BITNET is now just a memory.

Another way in which IBM supported the popularization of the Internet was via the development of the IBM Personal Computer. While the first IBM PC predated the commercial Internet by many years, it was the IBM PC standard that changed the course of computing and IT. The Apple II started the personal computing revolution, Commodore, Atari and Radio Shack (TRS-80) had their brief contributions, but it's no question that the IBM PC and the many compatible hardware emulations to follow opened up computing to a much wider audience.

The PC also served as a platform for networked communication, with store and forward networks like FidoNet acting like a BITNET for the masses. Later, in the heyday of dialup networks like Compuserv and AOL the PC was a popular platform for such connectivity. The personal Internet would not have happened nearly as quickly without the personal computer.

IBM was the dominant computing company for a large part of the twentieth century. You might say that information technology was to the 1900's what railroads were to the 1800's and IBM was in the middle of it all and driving much of the progress for most of the century. IBM no longer makes PCs (they sold that business to a Chinese company, Lenovo), but the idea that ordinary people can write apps, create videos, or develop the next big thing on the Internet would not be possible without the IBM's pioneering role in defining information
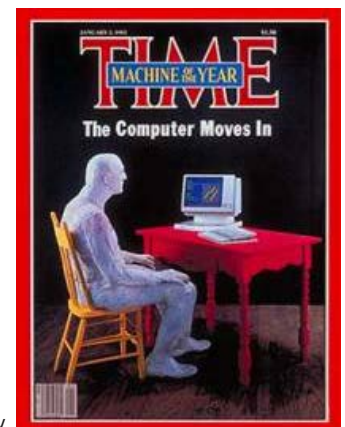
technology and personal computing. Even considering the positives and negatives associated with IBM, you can't deny its influence. That's a pretty impressive 100 years.

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The undergraduate and graduate catalogs are now online

Spring on the University of North Texas campus
Administration Building with bluebonnets, the state flower of Texas

The 2011-2012 UNT catalogs are now available online and have some new and helpful features (via *InHouse*):

- Advanced search features allow you to search by course prefix, course number, exact match, or descriptive phrases.

- The My Catalog feature allows you to save course and program information in a personal space (similar to an online shopping cart) that you can access from any computer with Internet access. All you need to get started is your e-mail address.

- Each section of the catalog has a print-friendly view to provide cleaner, more attractive pages when you print.

- Help in using the catalog is readily available – just look for the help icon at the top of each page.

- Switching from one catalog to another is as easy as clicking on the catalog you want from the drop-down list at the top right of the page and then on Go.

Visit both catalogs at: **http://catalog.unt.edu/**

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Helpdesk FYI

By Jonathan "Mac" Edwards, CITC Helpdesk Manager

IT Outages and Maintenance Events Page

From time to time a UNT IT system may experience an outage, temporary interruption, or undergo scheduled maintenance. During such times the CITC Helpdesk will often see a spike in call volume making it hard to reach us for more information. Instead of waiting in a queue you can check the IT Outages and Maintenance Events Page at http://helpdesk.unt.edu/outages.

Event Type Key

Resolved Unscheduled Outages will be displayed in **Green**.

Unscheduled Outages will be displayed in **Blue**.

Scheduled Broadcasts will be displayed in **ORANGE**.

Scheduled Maintenance will be displayed in **Navy**.

Add hoc Broadcasts will be displayed in **Yellow**.

You will find these Event Types on the left side of the website where you can easily toggle which Event Types should be displayed.

Clicking on an item will display additional information regarding the nature of the event, assignment, current status, and reported date.

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IRC News

Minutes provided by Christine Valenzuela Recording Secretary*

The IRC -- unofficially now known as the INFORMATION TECHNOLOGY COUNCIL (ITC) -- is currently undergoing a reorganization, see the May 20, 2008 minutes for more information.**>

No IRC/ITC minutes were available for publication this month.

For a list of IRC Regular and Ex-officio Members click here (last updated 12/12/08). Warren Burggren is now the Chair.

**DCSMT Minutes can be found here.

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Research and Statistical Support
University of North Texas

An alternative modeling strategy: Partial Least Squares

Link to the last RSS article here: Examination of Cross Validation techniques and the biases they reduce. -- Ed.

By **Dr. Jon Starkweather**, Research and Statistical Support Consultant

Partial Least Squares (PLS) modeling is often used as an alternative to traditional modeling techniques. Unlike traditional modeling techniques which rely upon covariance decomposition, PLS is a variance based (or components based) technique and does not carry with it many of the assumptions of covariance methods (i.e. distributional assumptions). It is sometimes considered an analysis of last resort because large samples are not *as* necessary with it, and PLS is less sensitive to multicollinearity. However, PLS is primarily descriptive when used with small samples and is still constrained with respect to making inferences about parameters when sample sizes are small. The benefit of having the ability to do descriptive analysis with small samples is that PLS can fit models with non-linear relationships and non-Gaussian distributions among the variables in addition to the traditional linear and Gaussian situations.

PLS is also quite versatile; it can be used as a regression technique, a principal components technique, a canonical correlation technique, or a path modeling (or structural equation modeling) technique. It is well documented that PLS is biased because the optimization is local rather than global level; however, as sample size increases PLS becomes less bias. PLS can be used to make inferences about parameters when sample sizes are large. PLS is often used when other methods fail (i.e. a slightly biased estimate is better than no estimate).

As an example, we will first model a simulated data set using traditional modeling techniques using a popular method and package. John Fox's (2010) package 'sem' is one of the more established modeling packages in R and will be used here to demonstrate how certain data sets do not converge on a specified model.

Example

First, import the data from the internet and run the ubiquitous 'head' function to get a look at the data. The example data contains 20 variables (v1 – v20) and 1000 cases. Here we will name the data 'pls.data'.

Next, create a covariance matrix object which will be passed on to the 'sem' function. The covariance object is named 'cov.m' (some of the matrix in the image below is not shown).

Next, load the 'sem' package by typing: library(sem) in the R console. Then, specify the sem measurement model (i.e. confirmatory factor model). The model specification syntax is given below (not in an image) due to its length.

measurement.model <- specify.model()

F1 -> v1, lam11, NA

F1 -> v2, lam12, NA

F2 -> v3, lam21, NA

F2 -> v4, lam22, NA

F2 -> v5, lam23, NA

F3 -> v6, lam31, NA

F3 -> v7, lam32, NA

F3 -> v8, lam33, NA

F3 -> v9, lam34, NA
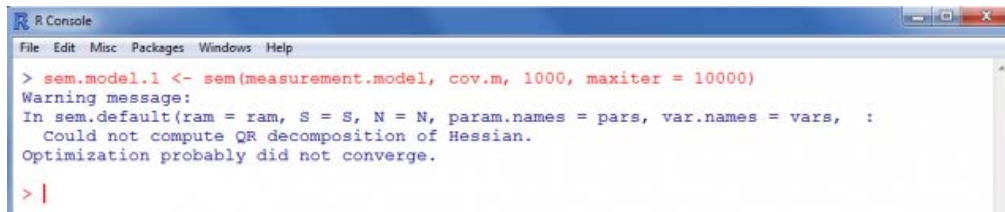
F3 -> v10, lam35, NA

F3 -> v11, lam36, NA

F4 -> v12, lam41, NA

F4 -> v13, lam42, NA

F4 -> v14, lam43, NA

F4 -> v15, lam44, NA

F5 -> v16, lam51, NA

F5 -> v17, lam52, NA

F5 -> v18, lam53, NA

F5 -> v19, lam54, NA

F5 -> v20, lam55, NA

v1 <-> v1, var1, NA

v2 <-> v2, var2, NA

v3 <-> v3, var3, NA

v4 <-> v4, var4, NA

v5 <-> v5, var5, NA

v6 <-> v6, var6, NA

v7 <-> v7, var7, NA

v8 <-> v8, var8, NA

v9 <-> v9, var9, NA

v10 <-> v10, var10, NA

v11 <-> v11, var11, NA

v12 <-> v12, var12, NA

v13 <-> v13, var13, NA

v14 <-> v14, var14, NA

v15 <-> v15, var15, NA

v16 <-> v16, var16, NA

v17 <-> v17, var17, NA

v18 <-> v18, var18, NA

v19 <-> v19, var19, NA

v20 <-> v20, var20, NA

F1 <-> F2, cov1, NA

F1 <-> F3, cov2, NA

F1 <-> F4, cov3, NA

F1 <-> F5, cov4, NA

F2 <-> F3, cov5, NA

F2 <-> F4, cov6, NA

F2 <-> F5, cov7, NA

F3 <-> F4, cov8, NA

F3 <-> F5, cov9, NA

F4 <-> F5, cov10, NA

F1 <-> F1, NA, 1

F2 <-> F2, NA, 1

F3 <-> F3, NA, 1

F4 <-> F4, NA, 1

F5 <-> F5, NA, 1

Next, we run the measurement model; but unfortunately, it does not converge.

```
R Console
File  Edit  Misc  Packages  Windows  Help
> sem.model.1 <- sem(measurement.model, cov.m, 1000, maxiter = 10000)
Warning message:
In sem.default(ram = ram, S = S, N = N, param.names = pars, var.names = vars,  :
  Could not compute QR decomposition of Hessian.
Optimization probably did not converge.

> |
```

So, we detach the 'sem' package using the following command: detach("package:sem") and decide to use a PLS strategy. The 'plspm' package (PLS Path Modeling; Sanchez & Trinchera, 2010) provides functions for conducting and graphing a variety of PLS techniques; such as PLS regression with a single outcome, PLS canonical correlation, PLS regression with multiple outcomes (similar to canonical correlation, but with directionality implied between the two composite variates), PLS principal components analysis, and PLS path modeling (i.e. SEM).
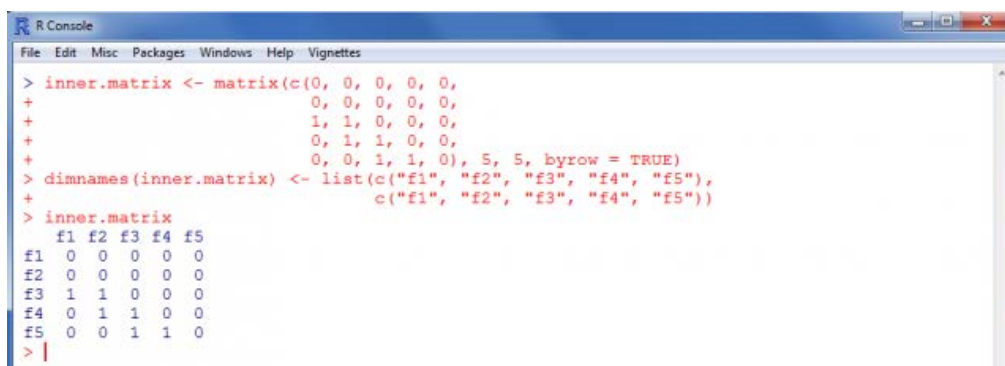
PLS   Path   Modeling

Load the package (which three dependencies [amap, diagram, shape]).
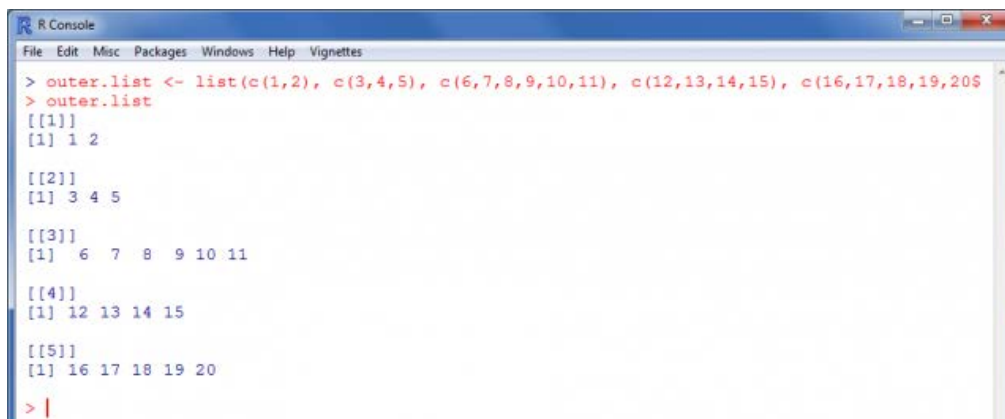
```
R Console
File  Edit  Misc  Packages  Windows  Help  Vignettes
> library(plspm)
Loading required package: amap
Loading required package: diagram
Loading required package: shape
> |
```

First, we must create a matrix which expresses the *inner* (structural) model; this model simply shows the relationships among the latent variables; where the column variable 'causes' the row variable(s) if a 'one' is in the intersecting cell (e.g. f1 and f2 cause f3 --> columns 1 and 2 cause row 3).

```
R Console
File  Edit  Misc  Packages  Windows  Help  Vignettes
> inner.matrix <- matrix(c(0,  0,  0,  0,  0,
+                          0,  0,  0,  0,  0,
+                          1,  1,  0,  0,  0,
+                          0,  1,  1,  0,  0,
+                          0,  0,  1,  1,  0), 5, 5, byrow = TRUE)
> dimnames(inner.matrix) <- list(c("f1", "f2", "f3", "f4", "f5"),
+                                c("f1", "f2", "f3", "f4", "f5"))
> inner.matrix
   f1 f2 f3 f4 f5
f1  0  0  0  0  0
f2  0  0  0  0  0
f3  1  1  0  0  0
f4  0  1  1  0  0
f5  0  0  1  1  0
> |
```

Next, create the list which expresses the outer (measurement) model; this model simply shows the relationships between the manifest variables and the latent variables (e.g. variables v1 and v2 are related to the first factor [f1]). Although we create a *list* object in R, this is often referred to as the outer *matrix* in the PLS literature.

```
R Console
File  Edit  Misc  Packages  Windows  Help  Vignettes
> outer.list <- list(c(1,2), c(3,4,5), c(6,7,8,9,10,11), c(12,13,14,15), c(16,17,18,19,20$
> outer.list
[[1]]
[1] 1 2

[[2]]
[1] 3 4 5

[[3]]
[1]  6  7  8  9 10 11

[[4]]
[1] 12 13 14 15

[[5]]
[1] 16 17 18 19 20

> |
```

Next, create a vector which identifies the "mode" of indicators which were used (i.e. "A" for reflective measurement or "B" for formative measurement). Recall, 'Reflective' measurement is said to occur when each manifest variable is "caused by" a latent variable and 'Formative' measurement is said to occur when each manifest variable "causes" the

latent variable. Below, all 5 latent variables in our model are "reflectively" measured (i.e. each latent causes the observed scores on the manifest variables).

```
R Console                                                          [_][□][x]
File  Edit  Misc  Packages  Windows  Help  Vignettes
> mode.vec <- c("A", "A", "A", "A", "A")
> mode.vec
[1] "A" "A" "A" "A" "A"
> |
```

Finally, we can run the Partial Least Squares Path Model. One of the benefits of using the 'plspm' package rather than one of the other PLS packages available in R, is that the 'plspm' package offers some very easy to use and interpret output. Each function provides a description of the function's output items and shows how to extract or reference them.

```
R Console                                                          [_][□][x]
File  Edit  Misc  Packages  Windows  Help  Vignettes
> pls.model.1 <- plspm(x = pls.data[,4:23], inner = inner.matrix, outer = outer.list, mod$
+    scheme = "factor", scaled = TRUE, plsr = TRUE, tol = 0.00001, iter = 100)
> pls.model.1

PARTIAL LEAST SQUARES PATH MODELING (PLS-PM)
--------------------------------------------------
Results available in the following objects:

      Name                   Description
1     "$outer.mod"           "outer model"
2     "$inner.mod"           "inner model"
3     "$latents"             "scaled LVs"
4     "$scores"              "LVs for scaled=FALSE"
5     "$out.weights"         "outer weights"
6     "$loadings"            "loadings"
7     "$path.coefs"          "path coefficients matrix"
8     "$r.sqr"               "R-squared"
9     "$outer.cor"           "outer correlations"
10    "$inner.sum"           "summary inner model"
11    "$effects"             "total effects"
12    "$unidim"              "unidimensionality"
13    "$gof"                 "goodnes-of-fit"
14    "$data"                "data matrix"
--------------------------------------------------
You can also use the function 'summary'

> |
```

Using the 'summary' function on a 'plspm' object provides a well-documented and indexed summary of the analysis' output. Below you can see that the current summary provides a very thorough summary with labels for each element which makes interpretation very straighforward. In fact, the output (from the 'summary') is so large that is necessitates four screen capture images to display it all here.

```
R Console                                                          [_][□][x]
File  Edit  Misc  Packages  Windows  Help  Vignettes
> summary(pls.model.1)

PARTIAL LEAST SQUARES PATH MODELING (PLS-PM)

--------------------------------------------------------------
MODEL SPECIFICATION
1    Number of Cases        1000
2    Latent Variables       5
3    Manifest Variables     20
4    Scale of Data          Standardized Data
5    Weighting Scheme       factor
6    Tolerance Crit         1e-05
7    Max Num Iters          100
8    Convergence Iters      3
9    Paths by PLS-R         TRUE
10   Bootstrapping          FALSE
11   Bootstrap samples      NULL

--------------------------------------------------------------
BLOCKS DEFINITION
     Block      Type      NMVs        Mode
1       f1   Exogenous       2    Reflective
2       f2   Exogenous       3    Reflective
3       f3  Endogenous       6    Reflective
4       f4  Endogenous       4    Reflective
5       f5  Endogenous       5    Reflective

--------------------------------------------------------------
BLOCKS UNIDIMENSIONALITY
     Type.measure  MVs  C.alpha  DG.rho  eig.1st  eig.2nd
f1     Reflective    2    0.846   0.928     1.73    0.267
f2     Reflective    3    0.778   0.871     2.08    0.566
f3     Reflective    6    0.885   0.913     3.83    0.618
f4     Reflective    4    0.890   0.924     3.02    0.472
f5     Reflective    5    0.918   0.939     3.78    0.431

--------------------------------------------------------------
OUTER MODEL
          weights  std.loads  communal  redundan
f1
   v1      0.570     0.940      0.883     0.000
   v2      0.504     0.922      0.849     0.000
f2
   v3      0.374     0.826      0.682     0.000
   v4      0.328     0.761      0.579     0.000
   v5      0.489     0.902      0.814     0.000
f3
   v6      0.222     0.846      0.716     0.531
   v7      0.192     0.760      0.578     0.429
   v8      0.168     0.673      0.453     0.336
   v9      0.251     0.896      0.803     0.596
   v10     0.221     0.838      0.703     0.521
   v11     0.190     0.759      0.576     0.427
```

Continued below.

```
R R Console
File Edit Misc Packages Windows Help Vignettes

  v9     0.251      0.896      0.803      0.596
  v10    0.221      0.838      0.703      0.521
  v11    0.190      0.759      0.576      0.427
f4
  v12    0.238      0.761      0.611      0.495
  v13    0.328      0.923      0.852      0.690
  v14    0.305      0.905      0.820      0.664
  v15    0.274      0.856      0.733      0.594
f5
  v16    0.206      0.814      0.663      0.577
  v17    0.263      0.943      0.888      0.772
  v18    0.248      0.910      0.828      0.720
  v19    0.222      0.860      0.740      0.643
  v20    0.208      0.813      0.661      0.575

-------------------------------------------------------------
CORRELATIONS BETWEEN MVs AND LVs
           f1       f2      f3     f4     f5
f1
  v1     0.9395  -0.0026  0.665  0.322  0.518
  v2     0.9216   0.0039  0.587  0.279  0.452
f2
  v3     0.0191   0.8256  0.414  0.609  0.550
  v4    -0.0261   0.7608  0.353  0.539  0.465
  v5     0.0039   0.9025  0.542  0.795  0.710
f3
  v6     0.5821   0.4506  0.846  0.664  0.739
  v7     0.4865   0.3942  0.760  0.579  0.648
  v8     0.4216   0.3724  0.673  0.489  0.563
  v9     0.6471   0.4993  0.896  0.756  0.845
  v10    0.5736   0.4519  0.838  0.664  0.734
  v11    0.4886   0.3846  0.759  0.568  0.637
f4
  v12    0.2511   0.5540  0.565  0.781  0.639
  v13    0.3034   0.7905  0.768  0.923  0.869
  v14    0.2950   0.7269  0.722  0.905  0.812
  v15    0.2732   0.6579  0.647  0.856  0.726
f5
  v16    0.4091   0.5527  0.674  0.693  0.814
  v17    0.5305   0.6952  0.872  0.874  0.943
  v18    0.6794   0.6670  0.818  0.829  0.910
  v19    0.4365   0.5974  0.735  0.738  0.860
  v20    0.4053   0.5397  0.694  0.690  0.813

-------------------------------------------------------------
INNER MODEL
$f3
     concept  value
1        R2  0.7419
2 Intercept  0.0000
3   path_f1  0.6743
4   path_f2  0.5355
```

Continued below.

```
R R Console
File Edit Misc Packages Windows Help Vignettes

$f3
     concept  value
1        R2  0.7419
2 Intercept  0.0000
3   path_f1  0.6743
4   path_f2  0.5355

$f4
     concept  value
1        R2  0.8105
2 Intercept  0.0000
3   path_f2  0.5238
4   path_f3  0.5036

$f5
     concept  value
1        R2  0.8695
2 Intercept  0.0000
3   path_f3  0.4773
4   path_f4  0.5099

-------------------------------------------------------------
CORRELATIONS BETWEEN LVs
        f1       f2      f3      f4      f5
f1  1.0000   0.0005  0.675  0.324  0.523
f2  0.0005   1.0000  0.536  0.794  0.706
f3  0.6746   0.5359  1.000  0.784  0.877
f4  0.3243   0.7936  0.784  1.000  0.884
f5  0.5231   0.7060  0.877  0.884  1.000

-------------------------------------------------------------
SUMMARY INNER MODEL
    LV.Type  Measure  MVs  R.square  Av.Commu  Av.Redun   AVE
f1  Exogen   Rflct     2    0.000     0.866     0.000    0.866
f2  Exogen   Rflct     3    0.000     0.692     0.000    0.692
f3  Endogen  Rflct     6    0.742     0.638     0.473    0.638
f4  Endogen  Rflct     4    0.810     0.754     0.611    0.754
f5  Endogen  Rflct     5    0.870     0.756     0.657    0.756

-------------------------------------------------------------
GOODNESS-OF-FIT
         GoF    value
1   Absolute  0.7632
2   Relative  0.9754
3  Outer.mod  0.9996
4  Inner.mod  0.9758

-------------------------------------------------------------
TOTAL EFFECTS
    relationships  dir.effects  ind.effects  tot.effects
1        f1->f2       0.000        0.000        0.000
2        f1->f3       0.674        0.000        0.674
3        f1->f4       0.000        0.340        0.340
```

Continued below.

```
3  Outer.mod  0.9996
4  Inner.mod  0.9758

----------------------------------------------------------------
TOTAL EFFECTS
     relationships  dir.effects  ind.effects  tot.effects
1            f1->f2        0.000        0.000        0.000
2            f1->f3        0.674        0.000        0.674
3            f1->f4        0.000        0.340        0.340
4            f1->f5        0.000        0.495        0.495
5            f2->f3        0.536        0.000        0.536
6            f2->f4        0.524        0.270        0.793
7            f2->f5        0.000        0.660        0.660
8            f3->f4        0.504        0.000        0.504
9            f3->f5        0.477        0.257        0.734
10           f4->f5        0.510        0.000        0.510
> |
```
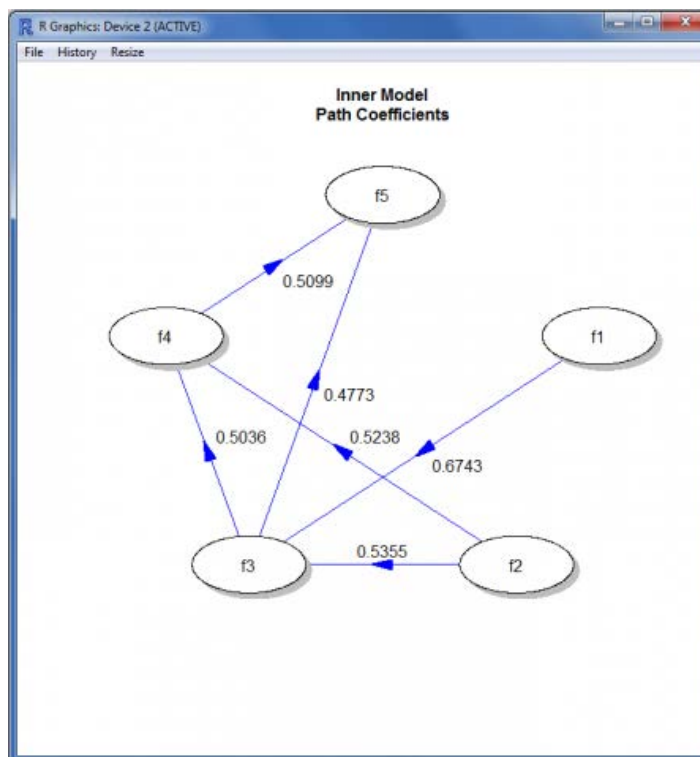
Another big advantage to using the 'plspm' package (rather than others available for PLS modeling) is the ability to produce a path diagram based on the model fitted.

Another advantage to using the 'plspm' package is the ability to conduct bootstrapped cross validation of a PLS path model using the 'boot.val' optional argument to the 'plspm' function.

```
R R Console

File Edit Misc Packages Windows Help Vignettes

> pls.model.2 <- plspm(x = pls.data[,4:23], inner = inner.matrix, outer = outer.list, mod$
+     scheme = "factor", scaled = TRUE, plsr = TRUE, boot.val = TRUE, br = 200, tol = 0.00$
> pls.model.2

PARTIAL LEAST SQUARES PATH MODELING (PLS-PM)
------------------------------------------------
Results available in the following objects:

      Name                Description
1     "$outer.mod"        "outer model"
2     "$inner.mod"        "inner model"
3     "$latents"          "scaled LVs"
4     "$scores"           "LVs for scaled=FALSE"
5     "$out.weights"      "outer weights"
6     "$loadings"         "loadings"
7     "$path.coefs"       "path coefficients matrix"
8     "$r.sqr"            "R-squared"
9     "$outer.cor"        "outer correlations"
10    "$inner.sum"        "summary inner model"
11    "$effects"          "total effects"
12    "$unidim"           "unidimensionality"
13    "$gof"              "goodnes-of-fit"
14    "$boot"             "bootstrap results"
15    "$data"             "data matrix"
------------------------------------------------
You can also use the function 'summary'

>
```

Notice in the above table, there is a "$boot" element in the output. The rest of the output is identical to what was displayed above. The "$boot" element contains the cross validation output, which is the only part of the output displayed below.

```
R R Console

File Edit Misc Packages Windows Help Vignettes

10        f4->f5         0.510       0.000       0.510

--------------------------------------------------------------------
BOOTSTRAP VALIDATION
weights
        Original  Mean.Boot  Std.Error  perc.05  perc.95
v1       0.570      0.571      0.00873   0.557    0.586
v2       0.504      0.503      0.00764   0.491    0.516
v3       0.374      0.375      0.00976   0.358    0.390
v4       0.328      0.327      0.01060   0.310    0.343
v5       0.489      0.490      0.01127   0.472    0.509
v6       0.222      0.222      0.00372   0.216    0.228
v7       0.192      0.192      0.00401   0.186    0.198
v8       0.168      0.168      0.00527   0.160    0.176
v9       0.251      0.251      0.00440   0.243    0.258
v10      0.221      0.221      0.00381   0.215    0.227
v11      0.189      0.190      0.00416   0.183    0.197
v12      0.238      0.238      0.00434   0.231    0.245
v13      0.328      0.328      0.00375   0.321    0.334
v14      0.306      0.305      0.00343   0.300    0.311
v15      0.274      0.275      0.00359   0.269    0.280
v16      0.206      0.206      0.00264   0.201    0.209
v17      0.263      0.263      0.00297   0.258    0.268
v18      0.248      0.248      0.00265   0.244    0.252
v19      0.222      0.221      0.00272   0.217    0.225
v20      0.208      0.208      0.00277   0.204    0.213

loadings
        Original  Mean.Boot  Std.Error  perc.05  perc.95
v1       0.939      0.939      0.00357   0.933    0.945
v2       0.922      0.921      0.00566   0.912    0.930
v3       0.826      0.826      0.01168   0.806    0.844
v4       0.761      0.759      0.01683   0.731    0.786
v5       0.902      0.903      0.00522   0.895    0.912
v6       0.846      0.846      0.00835   0.831    0.861
v7       0.760      0.760      0.01558   0.733    0.785
v8       0.673      0.673      0.02030   0.640    0.705
v9       0.896      0.896      0.00598   0.886    0.905
v10      0.838      0.838      0.01008   0.820    0.853
v11      0.759      0.758      0.01425   0.735    0.780
v12      0.781      0.782      0.01203   0.762    0.802
v13      0.923      0.923      0.00453   0.916    0.930
v14      0.905      0.905      0.00490   0.897    0.913
v15      0.856      0.857      0.00922   0.841    0.872
v16      0.815      0.814      0.01043   0.796    0.829
v17      0.943      0.943      0.00283   0.938    0.947
v18      0.910      0.909      0.00521   0.901    0.918
v19      0.860      0.859      0.00871   0.845    0.872
v20      0.813      0.813      0.01042   0.796    0.831

paths
        Original  Mean.Boot  Std.Error  perc.05  perc.95
f1->f3   0.674      0.673      0.0151    0.648    0.698
```

Continued below.

Interpretation was excluded from this article because the output of the functions covered is considered fairly intuitive. However, if one would like more information on interpreting PLS models, see Chin (2010).

Until next time, I'll drive my *Chevy to the leeve..*

References & Resources

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Columns

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Link of the Month

Helpdesk FYI

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RSS Matters

Short Courses

Staff Activities

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Short Courses

Instructor-led courses are not currently being offered. Please contact an RSS member or Claudia Lynch if you are interested in taking such a class or wish to have someone offer a class for your students. **SPSS and SAS courses are now offered *online* only.** RSS staff will be still be available for consultation on those topics, however. Another class available online is ***Introduction to R***.

Surf over to the Short Courses page to see instructions for accessing the SPSS and SAS online learning and other training that is available to you. You can also see the sorts of instructor led courses that have been offered in the past.

Special classes can always be arranged with the RSS staff. See "Customized Short Courses" below for further information. Also, you can ***always*** contact the RSS staff for one-on-one consultation. **Please read the FAQ before requesting an appointment though.**

Especially for Faculty and Staff Members

In addition to the ACS Short Courses, which are available to students, faculty and staff, staff and faculty members can take courses offered through the Human Resources Department (they have a new comprehensive training curriculum), and the Center for Learning Enhancement, Assessment, and Redesign. Additionally, the Center for Achievement and Lifelong Learning offers a variety of courses, usually for a small fee.

EIS training is available. Questions or comments relating to EIS training should be sent to EISTCA@unt.edu.

Microsoft E-Learning

Microsoft E-Learning courses are now available for ***faculty and staff*** via our UNT-Microsoft Campus Agreement. Please contact Claudia Lynch at lynch@unt.edu for instructions on accessing this training. If you haven't accessed the training since last year you will need to get a new access code.

Microsoft Outlook Tutorials and much more

The Enterprise Messaging and Directory Services Group has all sorts of useful information on their website, including tutorials and FAQs. The home page displays a list of their newest tutorials with tutorial topic pages displaying the most accessed pages. You can search the site for whatever you're interested via a Search Box on the left-hand side of the page.

Central Web Support

Consult Central Web Support for assistance in acquiring "Internet services and support." As described on their website:

CWS provides Internet services and support to UNT faculty, staff and students. Services include allocating and assisting departments, campus organizations and faculty with web space and associated applications. Additionally, CWS assists web developers with databases and associated web applications, troubleshooting problems, support and service.

CLEAR (was Center for Distributed Learning)

CLEAR offers courses especially for Faculty Members. A list of topics and further information can be found here.

The center has, in the past, offered a "Brown Bag" series which meets for lunch once a month at noon. The purpose of this group is to bring faculty members together to share their experiences with distributed learning. One demonstration will be made at each meeting by a faculty member with experience in distributed learning. More information on these activities can be found at the CLEAR Website.

Ed2go

Ed2go are courses that are offered, for a fee, to UNT faculty, staff and students as well as the general public. According to the CALL website:

> CALL has partnered up to provide online learning on a variety of topics. From standardized test preparation to database programming to training for libraries and their staff, there's a variety of areas from which to choose in online learning.
>
> The online minicourses, provided in conjunction with Ed2go, are standardized 12-lesson modules released over a six week period. (Courses are active for eight weeks to provide some flexibility). Each module features a quiz. Lessons are instructor-led and course participants and instructor communicate through a course discussion board. Lessons can be downloaded and saved. At the end of the course there is a final quiz. A passing grade opens a window that allows students to print out a course completion certificate.
>
> All courses are $89, and UNT faculty, staff and students may receive a $10 discount.

For additional information surf over to http://www.ed2go.com/unt/

Information Security Awareness

The UNT Information Security team offers Information Security Awareness courses to all UNT faculty and staff. Topics to be covered will include workstation security, sensitive data handling, copyright infringement issues, identity theft, email security, and more.

It is a policy requirement that ALL staff take an information security course at least once a year.

Please contact Allan Anderson in CITC Information Security if you have any questions, or would like more information about the online training. **Either attending a live class or going through the online training will count towards your training requirement.** You can also request a customized course to be taught for your department.

Alternate Forms of Training

Many of the General Access Labs around campus have tutorials installed on their computers. See http://www.gal.unt.edu/ for a list of labs and their locations. The Willis Library, for example, has a list of Tutorials and Software Support. The Library Instructional Unit also offers workshops and training, including "tech skills" training. Visit their websites for more information: http://www.library.unt.edu/library-instruction

The Training Website has all sorts of information about alternate forms of training. Computer Based Training (CBT) and Web-based training are some of the alternatives offered, although due to the rising costs of training, shrinking budgets and changing technology, computer-based training at UNT is in a state of transition. For up-to-date information on CBT at UNT, see the CBT website.

Gartner Research Services

Way back in 2006 we announced *Gartner Core Research Services Now Available to the UNT Community*. Our subscription for Gartner services has always included *all* UNT faculty, students, and staff. All you need to do to access the subscription is to **log into the UNT Gartner portal page** at https://gartner.unt.edu/. Once you have logged in, you can view upcoming webinars: http://www.gartner.com/webinars/ and listen to Gartner podcasts here: http://www.gartner.com/it/products/podcasting/asset_137461_2616.jsp.

State of Texas Department of Information Resources

Another possible source of training for staff and, perhaps, faculty members is the Texas Department of Information Resources. A look at their Education and Training website reveals some interesting possibilities.

New Horizons Computer Learning Centers

New Horizins is a DIR vendor, which means that state agencies, like UNT, get special pricing for their services negotiated at the State level (click here for more information about DIR vendors). New Horizons offers courses at their own facilities in Dallas and Fort Worth, but will arrange for onsite training as well.

BOOKMARK

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Staff Activities

Transitions

New Employees:

- **Quenton Pegues**, IT Technician, Computer Operations.

- **Lauren Lucas**, Administrative Specialist, Budget & Employee Services, Administration and Compliance.

- **Josh Alexander**, Operations Student Technician (part-time).

- **Dorothy Arrington**, UNT Administration Support student assistant (part-time).

- **Lee Wattron**, CSS Tech, Classroom Support Services (part-time).

No longer working in the Computing and Information Technology Center:

- **Wesley Gould**, CSS Tech, Classroom Support Services (part-time).

- **Quenton Pegues**, Operations Student Technician (part-time). Moved to full-time position.

- **William Clark**, Telecom Student Employee (part-time).

Changes, Awards, Recognition, Publications, etc.

Service to UNT

Congratulations also to these folks who are celebrating:

10 years of Service

- **Jesse White, IT Programmer Analyst**, Enterprise Applications.

- **David Franklin**, IT Specialist, Data Communications, Communications & Collaboration Services.

5 years of service

- **Adam Jensen**, IT Manager, Central Web Support, Enterprise Systems Technical Services.

They were all recently recognized in *InHouse*.

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