Vital Signs Report

Robert Jackson

5/31/2018

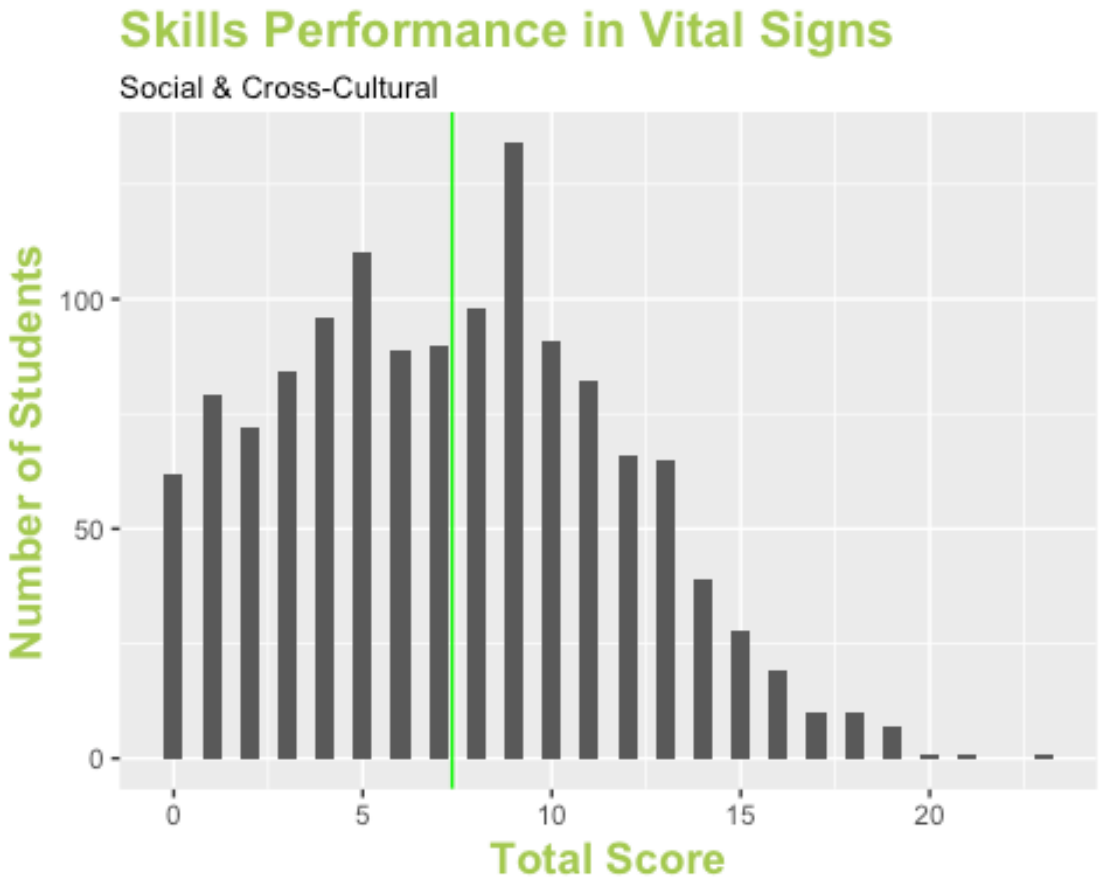
Part 1:

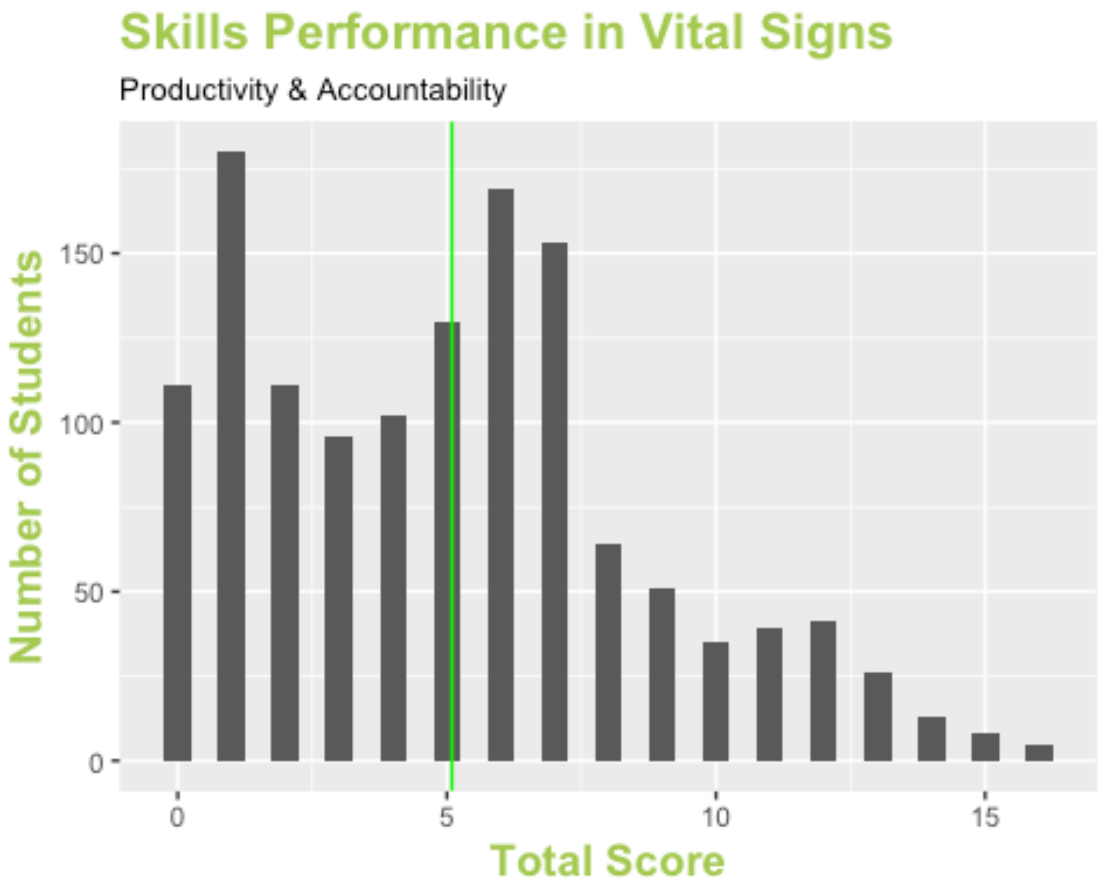
```
VS_Skills2 <- VS_Skills2[!duplicated(VS_Skills2), ]
```

Summary Statistics of Vital Signs - 2017 - 18 [table 1]

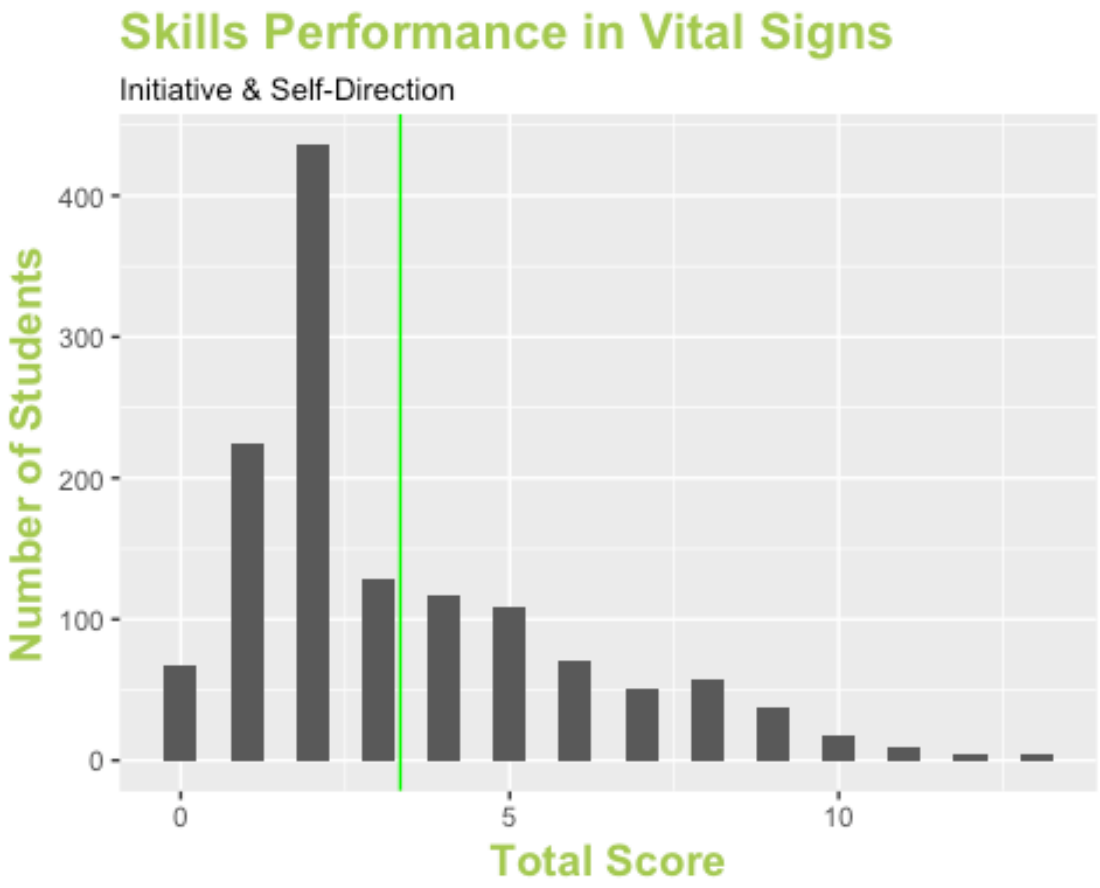
```
##             Social Productivity  Leadership  Initiative Flexibility
## Mean      7.368066     5.093703    8.412294    3.336582    4.829085
## SD        4.422737     3.645105    4.748217    2.567597    5.218485
## Median    7.000000     5.000000    7.000000    2.000000    2.000000
## Min       0.000000     0.000000    0.000000    0.000000    0.000000
## Max      23.000000    16.000000   24.000000   13.000000   22.000000
## N      1334.000000  1334.000000 1334.000000 1334.000000 1334.000000
##        Total.Good.Decisions    episodes      Grades
## Mean               29.28936    5.845577    7.967016
## SD                 19.17128    3.777394    2.446509
## Median             25.00000    5.000000    7.000000
## Min                 1.00000    1.000000    3.000000
## Max                91.00000   12.000000   13.000000
## N                1334.00000 1334.000000 1334.000000
```

Histograms of Skill Point Distribution *[Cummunlative]*

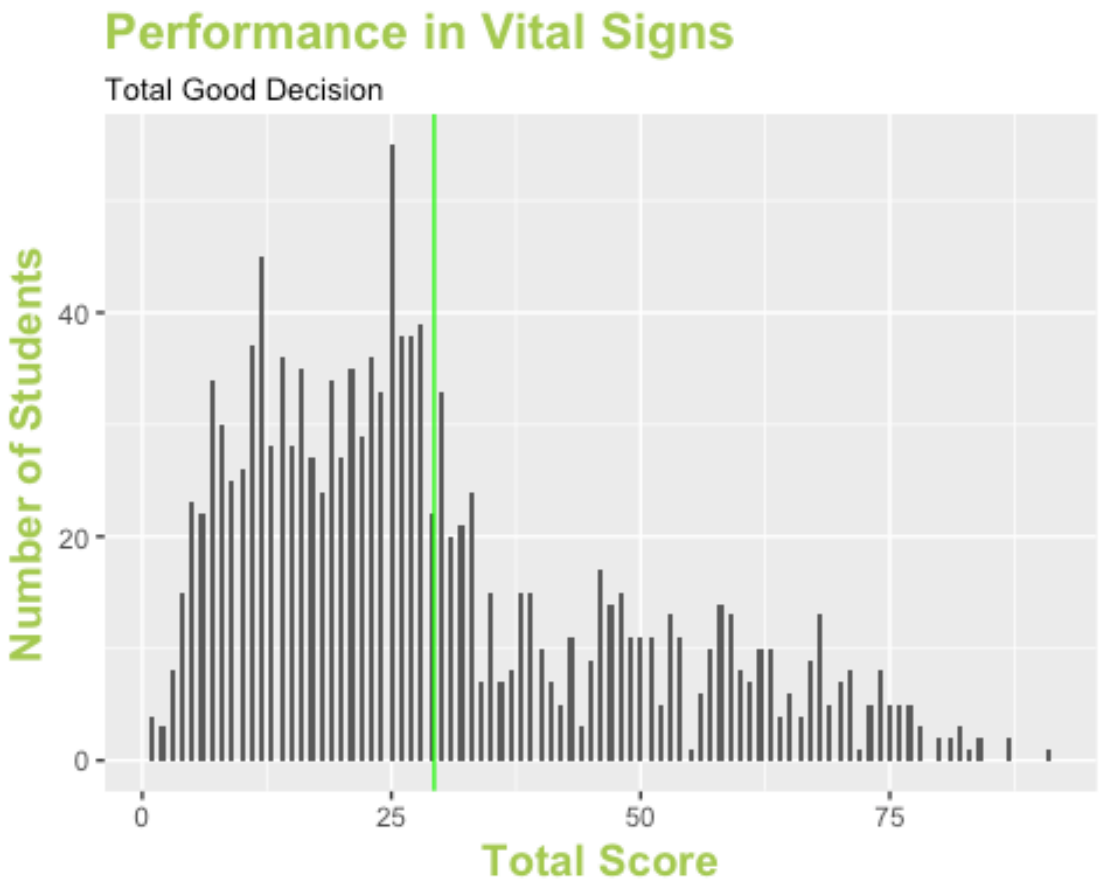


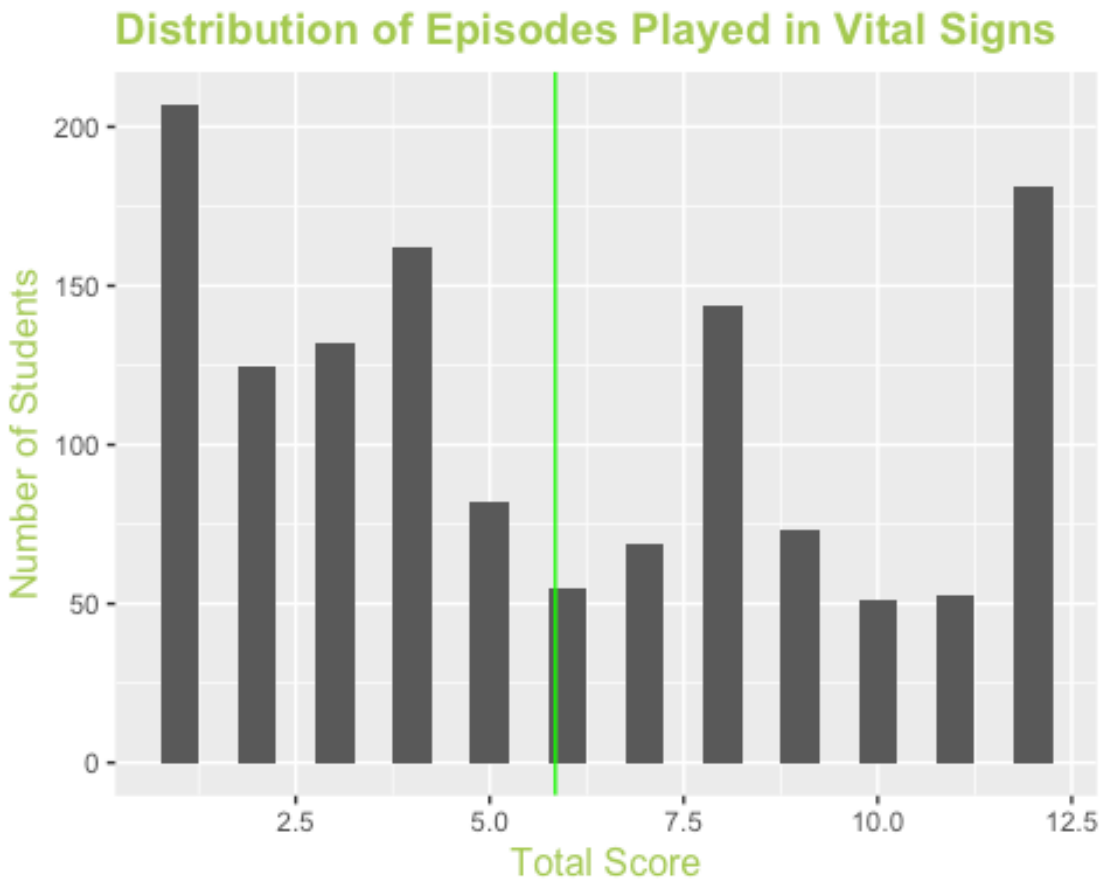

Skills Performance in Vital Signs
Productivity & Accountability
Number of Students
150
100
50
0
0
5
10
15
Total Score

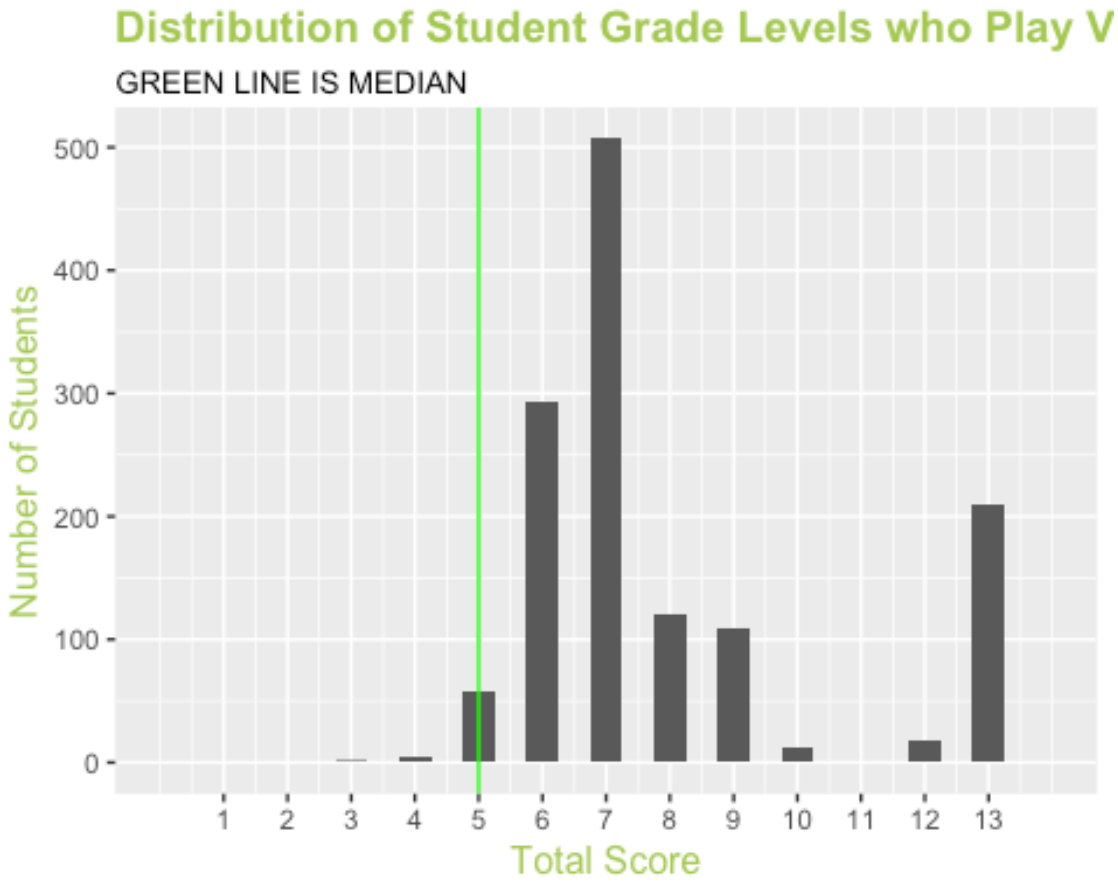

Skills Performance in Vital Signs
Leadership & Responsibility
Number of Students
200
150
100
50
0
0
5
10
15
20
25
Total Score


Skills Performance in Vital Signs
Initiative & Self-Direction
Number of Students
400
300
200
100
0
0
5
10
Total Score


Skills Performance in Vital Signs
Flexibility & Adaptability
Number of Students
200
100
0
0
5
10
15
20
Total Score


Performance in Vital Signs
Total Good Decision
Number of Students
40
20
0
0
25
50
75
Total Score


Distribution of Episodes Played in Vital Signs
Number of Students
200
150
100
50
0
2.5
5.0
7.5
10.0
12.5
Total Score



Summary Statistics of Skill Point Distribution [By Percentage] *The additional varaibles takes into account the particular episodes played by students and which points were available for them to score.*

Motified Summary Statistics of Vital Signs Including Percentage - 2017 - 18 [table 2]

```
##             SocialR        ProdR        LeadR  InitiativeR
FlexR
## Mean      0.6292242    0.5091815    0.7020609    0.6369561
0.4372367
## SD        0.2087652    0.2122707    0.1572709    0.2575319
0.2523438
## Median    0.6666667    0.5263158    0.7037037    0.6000000
0.4666667
## Min       0.0000000    0.0000000    0.0000000    0.0000000
0.0000000
## Max       1.0000000    1.0000000    1.0000000    1.0000000
1.0000000
## N      1334.0000000 1334.0000000 1334.0000000 1334.0000000
1334.0000000

##        Points_Earned_Social Points_Earned_Productivity
## Mean               8.886807                  6.433283
```

```
## SD                  5.143690                   4.246314
## Median              9.000000                   6.000000
## Min                 0.000000                   0.000000
## Max                23.000000                  17.000000
## N                1334.000000                1334.000000
##        Points_Earned_Leadership Points_Earned_Flexibility
## Mean                  10.259370                   6.931034
## SD                     5.494747                   6.106559
## Median                 8.000000                   6.000000
## Min                    0.000000                   0.000000
## Max                   25.000000                  23.000000
## N                   1334.000000                1334.000000
##        Points_Earned_Initiative Points_Available_Social
## Mean                   4.639430                13.670915
## SD                     3.272056                 6.466866
## Median                 4.000000                14.000000
## Min                    0.000000                 0.000000
## Max                   13.000000                23.000000
## N                   1334.000000              1334.000000
##        Points_Available_Productivity Points_Available_Leadership
## Mean                       12.047976                   15.104948
## SD                          6.874228                    8.151662
## Median                     10.000000                   11.000000
## Min                         1.000000                    2.000000
## Max                        22.000000                   27.000000
## N                        1334.000000                 1334.000000
##        Points_Available_Flexibility Points_Available_Initiative
## Mean                       13.108696                   8.178411
## SD                          8.815575                   5.788439
## Median                     12.000000                   8.000000
## Min                         1.000000                   0.000000
## Max                        26.000000                  18.000000
## N                        1334.000000                1334.000000
```

Histogram of Skill Point Distribution [By Percentage]

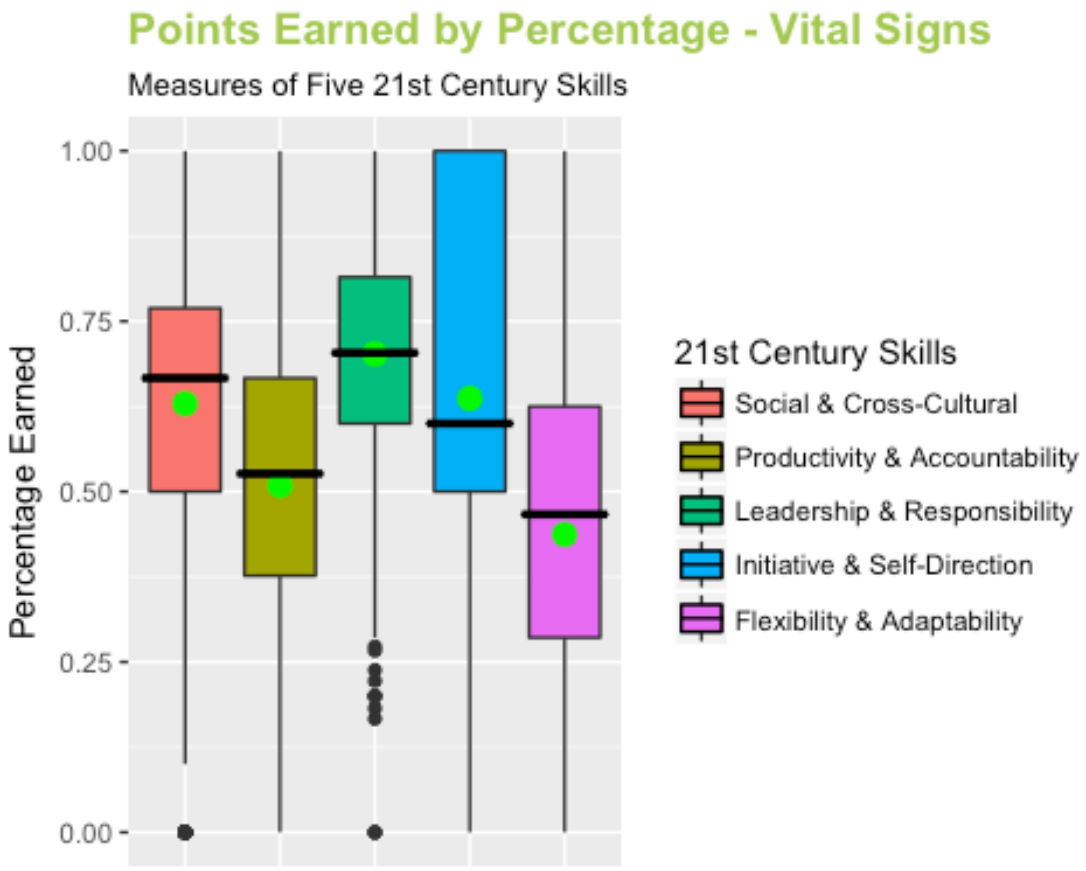
This takes into account the particular episodes played by students and which points were avaiable for them to score. The distribution is now a scale of 0 - 100%.

Meaning student could have earns 0% of the points available to them based on the episodes they played or they may have earned 100% of the point available to them in the episodes they've played.

Box Plot of 21st Century Skills by Percentage

```
## No id variables; using all as measure variables

## Warning: Removed 2 rows containing non-finite values (stat_boxplot).
```

```
## Warning: Removed 2 rows containing non-finite values (stat_summary).

## Warning: Removed 2 rows containing non-finite values (stat_summary).
```



We'll use this next section to outline how many student had an opportunity to perform each of the five 21st century skills

```
D1 <- dplyr::select(VSPer_Skills, contains("possible_"))

## No id variables; using all as measure variables
```

This boxplot is dynamic and analyzes what episodes of the game students reach and whether they encounter an opportunity to demonstrate one of the five 21st century skills. Since these skills don't appear evenly throughout the game its important to know in which ways students are not being exposed to

certain skill opportunities.

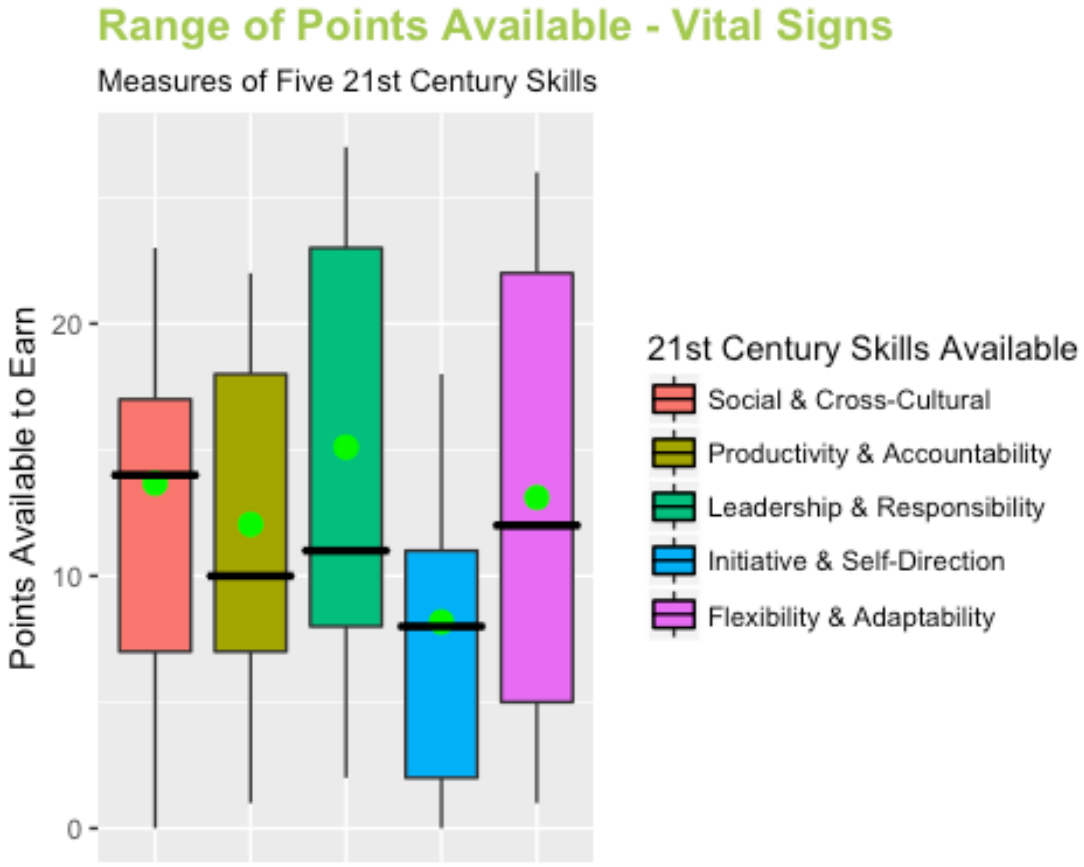


Table of Points Availabe to Earn - Vital Signs

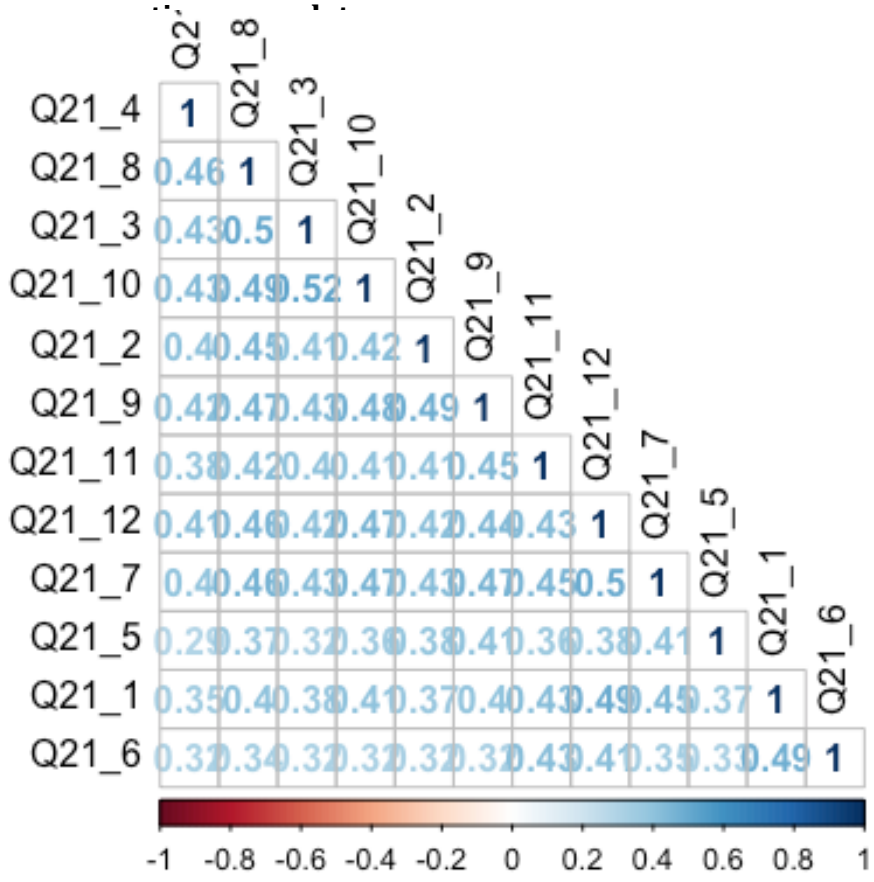
These are the count of students who have encountered an opportunity to demonstrate a particular 21st century skill.

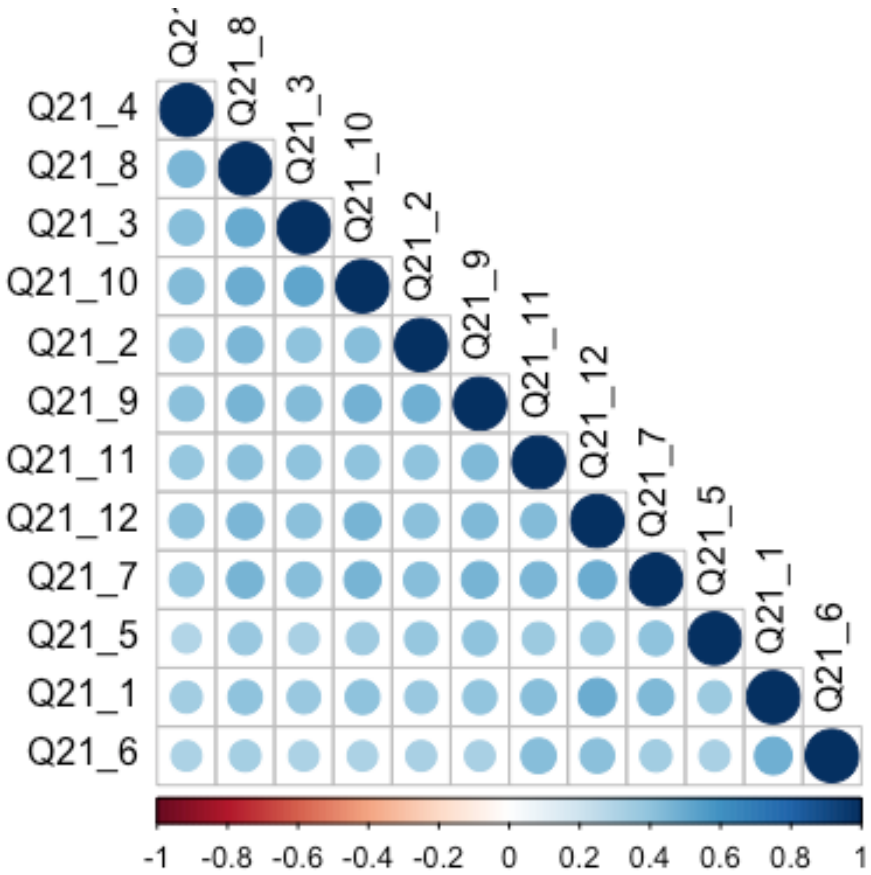
```
##       Points_Available_Social Points_Available_Productivity
##                          1333                          1334
##   Points_Available_Leadership   Points_Available_Initiative
##                          1334                          1333
##  Points_Available_Flexibility
##                          1334
```

Part Two:

We're now going to add the survey data. Go through the same EDA. Then finally we'll look at the correlation between the skills in VS and the measures in the survey data.

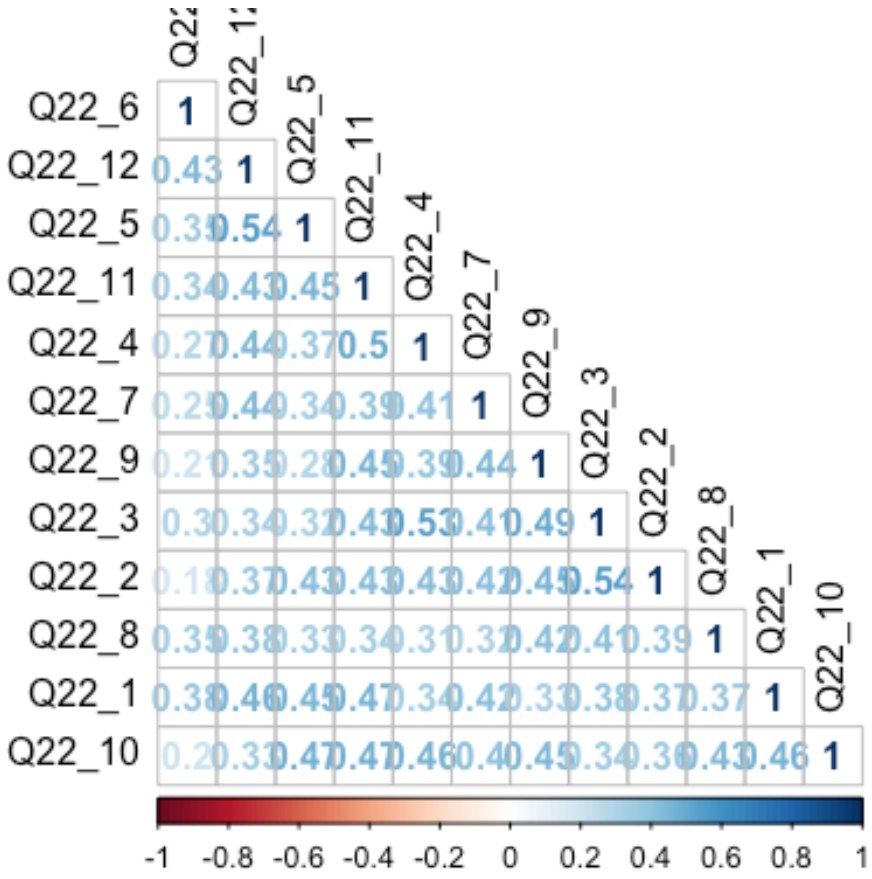
Working through Survey 1

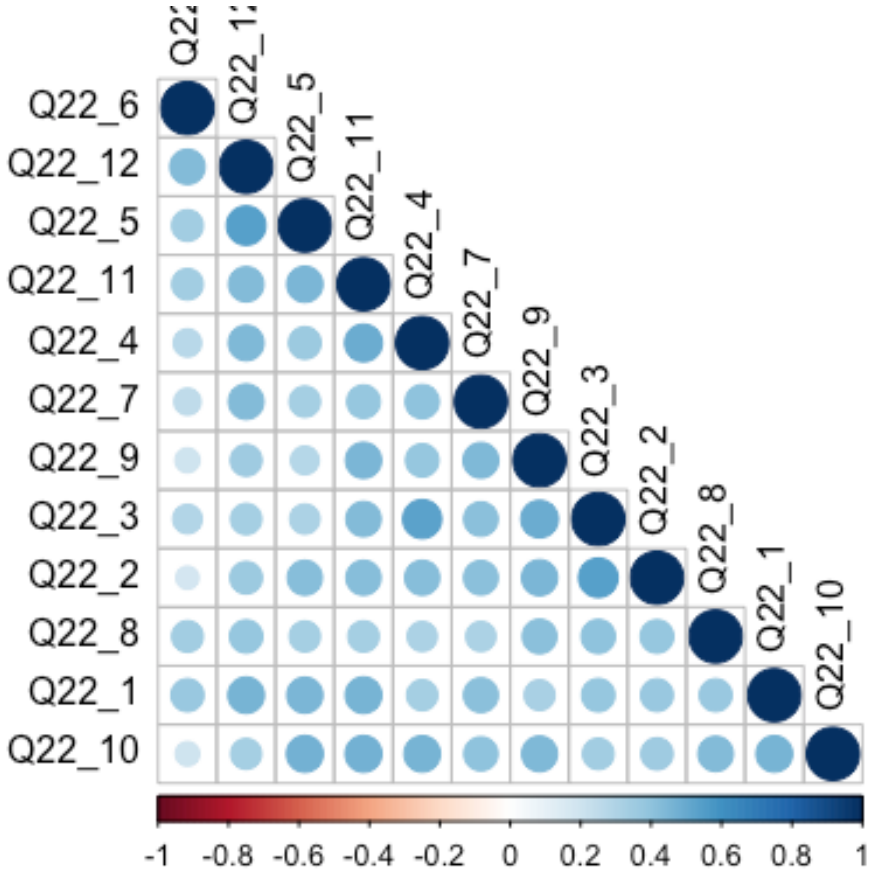

Q21_4
Q21_8
Q21_3
Q21_10
Q21_2
Q21_9
Q21_11
Q21_12
Q21_7
Q21_5
Q21_1
Q21_6
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1


Q21_4
Q21_8
Q21_3
Q21_10
Q21_2
Q21_9
Q21_11
Q21_12
Q21_7
Q21_5
Q21_1
Q21_6
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

Survey 2

Corplot of the Milwaukee Survey Questions





Part Three: Creating the 2 cumulative measures from the External Instruments & Time to merge External and internal metrics

---

```
# Renaming the Variables for ease of use.

SurveyM2 <- dplyr::rename(
SurveyM,
"Users" = "Your Game Username",
"Q1" = "I can set an example for others.",
"Q2" = "I can contribute to group efforts.",
"Q3" = "I can take an active role in learning.",
"Q4" = "I compare possible solutions to find the best one.",
"Q5" = "I can do things on my own.",
"Q6" = "I usually have more than one source of information before
making a decision.",
"Q7" = "I take steps to accomplish goals.",
"Q8" = "I can be in charge of a group of classmates.",
```

```
"Q9" = "I compare different ideas when thinking about a topic.",
"Q10" = "When faced with a decision, I realize that some choices are
better than others.",
"Q11" = "I use what I know already to solve new problems.",
"Q12" = "I think about all the information I have about making new
decisions."
)
```

Summary Statistics of External Measures - 2017 - 18 [table 3]

```
         LCSDI      CTDMPS         L_C        SD_I          CT
```

Mean 17.003609 16.675448 7.465948 7.743241 4.668354 SD 3.186401 3.230627 1.678105 1.567088 1.128781 Median 17.666667 17.500000 8.000000 8.000000 4.500000 Min 5.166667 5.166667 2.333333 2.333333 1.500000 Max 20.666667 20.666667 9.333333 9.333333 6.000000 N 2150.000000 2150.000000 2150.000000 2150.000000 2150.000000 DM PS Mean 4.853287 4.976471 SD 1.081932 1.089240 Median 5.000000 5.000000 Min 1.500000 1.500000 Max 6.000000 6.000000 N 2150.000000 2150.000000

```
write.csv(MasterFrame1, file = "AllVariables.VS.6.5.2018.csv")
```

MasterFrame1 <- dplyr::select(MasterFrame1, Users, Total.Good.Decisions, episodes, SocialR, ProdR, LeadR, InitiativeR, FlexR, Response_ID, Student, LCSDI, CTDMPS, L_C, SD_I, CT, DM, PS)

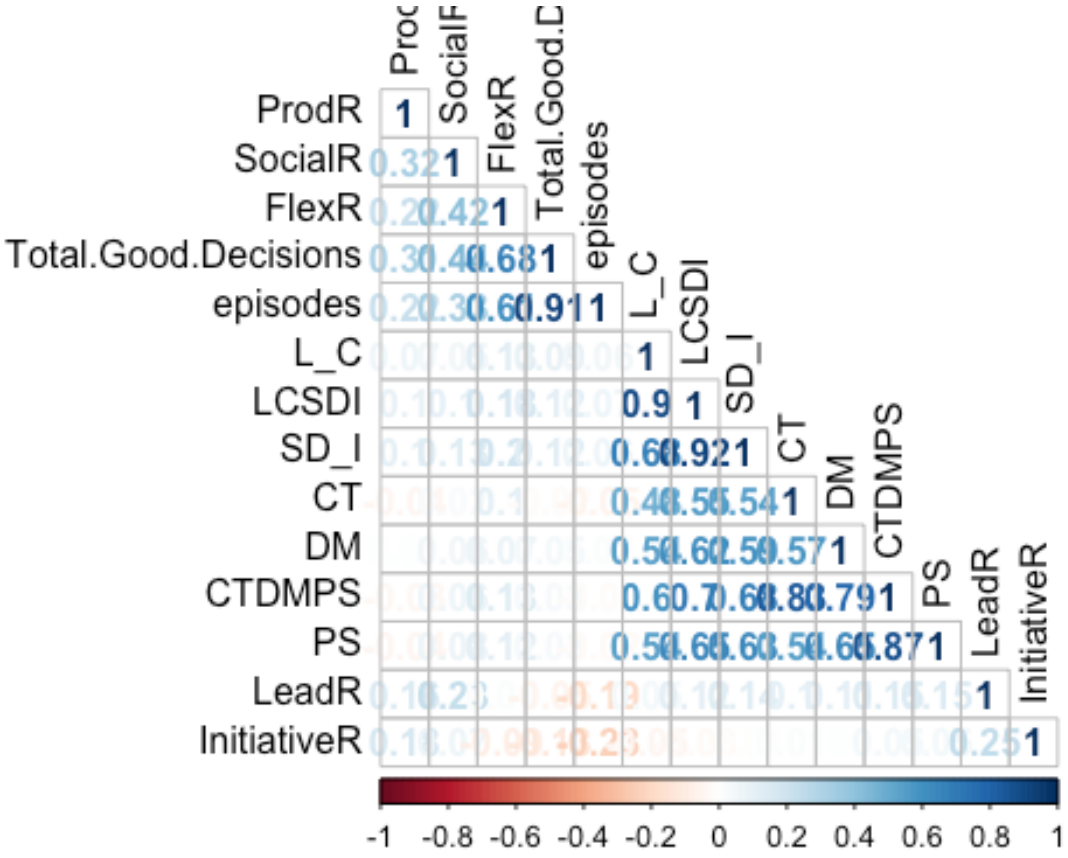
Summary Statistics of Vital Signs & Survey Data 2017 - 2018 [table 4]

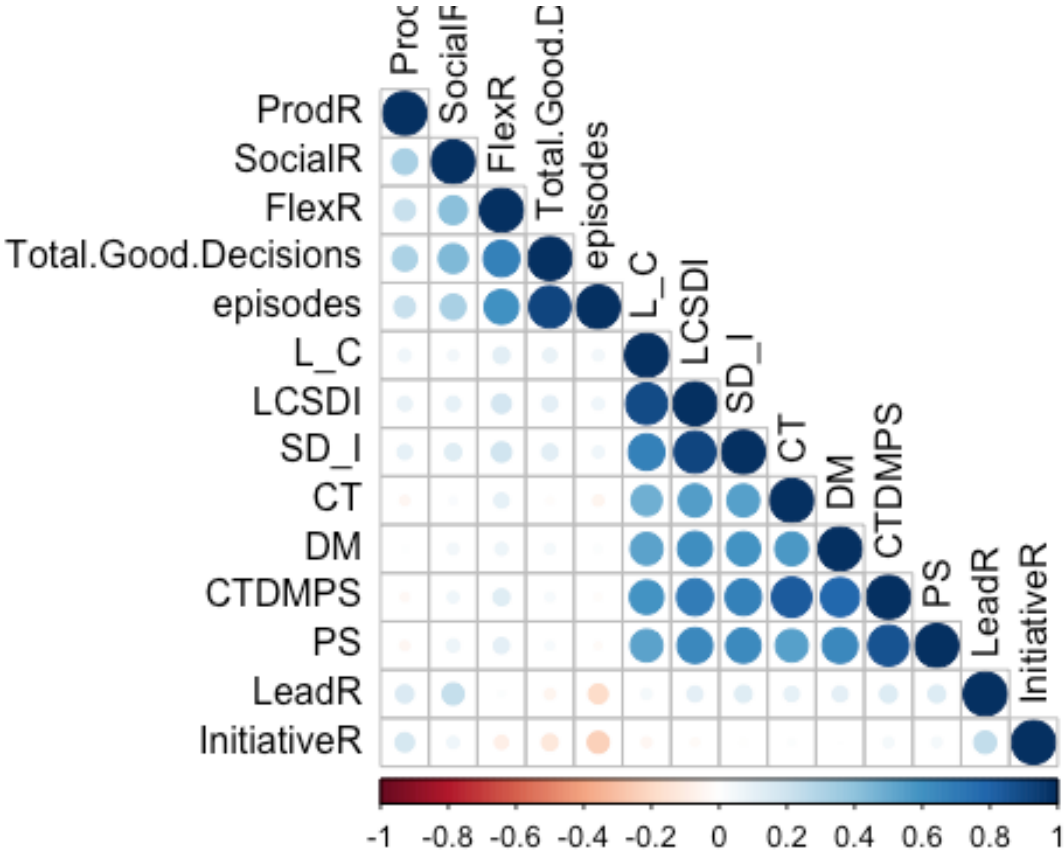
```
   Points_Earned_Social Points_Available_Social
```

Mean 9.779412 14.51961 SD 5.701124 6.91008 Median 10.000000 15.00000 Min 0.000000 1.00000 Max 22.000000 23.00000 N 612.000000 612.00000 Points_Earned_Productivity Points_Available_Productivity Mean 7.055556 12.973856 SD 4.469228 7.236204 Median 7.000000 12.000000 Min 0.000000 2.000000 Max 17.000000 22.000000 N 612.000000 612.000000 Points_Earned_Leadership Points_Available_Leadership Mean 11.207516 16.344771 SD 5.982332 8.652621 Median 9.500000 17.000000 Min 2.000000 5.000000 Max 25.000000 27.000000 N 612.000000 612.000000 Points_Earned_Initiative Points_Available_Initiative Mean 5.351307 9.367647 SD 3.580148 6.106834 Median 5.000000 9.000000 Min 0.000000 1.000000 Max 13.000000 18.000000 N 612.000000 612.000000 Points_Earned_Flexibility Points_Available_Flexibility Mean 8.173203 14.596405 SD 6.648732 9.159552 Median 8.000000 14.000000 Min 0.000000 1.000000 Max 23.000000 26.000000 N 612.000000 612.000000 Total.Good.Decisions episodes Grades SocialR ProdR Mean 35.69444 6.498366 7.223856 0.6460814 0.5223357 SD 20.63714 4.023458 1.709860 0.2003075 0.2019923 Median 31.00000 6.000000 7.000000 0.6666667 0.5454545 Min 2.00000 1.000000 5.000000 0.0000000 0.0000000 Max 87.00000 12.000000 13.000000 1.0000000 1.0000000 N 612.00000 612.000000 612.000000 612.0000000 612.0000000 LeadR InitiativeR FlexR LCSDI CTDMPS Mean 0.7032195 0.6202948 0.4599305 17.304062 16.983005 SD 0.1426991 0.2417112

0.2493611 3.124828 3.102452 Median 0.7037037 0.5833333 0.5000000 18.333333 17.500000 Min 0.2000000 0.0000000 0.0000000 5.166667 5.166667 Max 1.0000000 1.0000000 1.0000000 20.666667 20.666667 N 612.0000000 612.0000000 612.0000000 612.000000 612.000000 L_C SD_I CT DM PS Mean 7.624339 7.872114 4.723684 4.944542 5.095238 SD 1.623520 1.531734 1.100192 1.023966 1.055322 Median 8.000000 8.333333 5.000000 5.000000 5.500000 Min 2.333333 2.333333 1.500000 1.500000 1.500000 Max 9.333333 9.333333 6.000000 6.000000 6.000000 N 612.000000 612.000000 612.000000 612.000000 612.000000

Correlation plot of the External measures and the Internal measures from VS



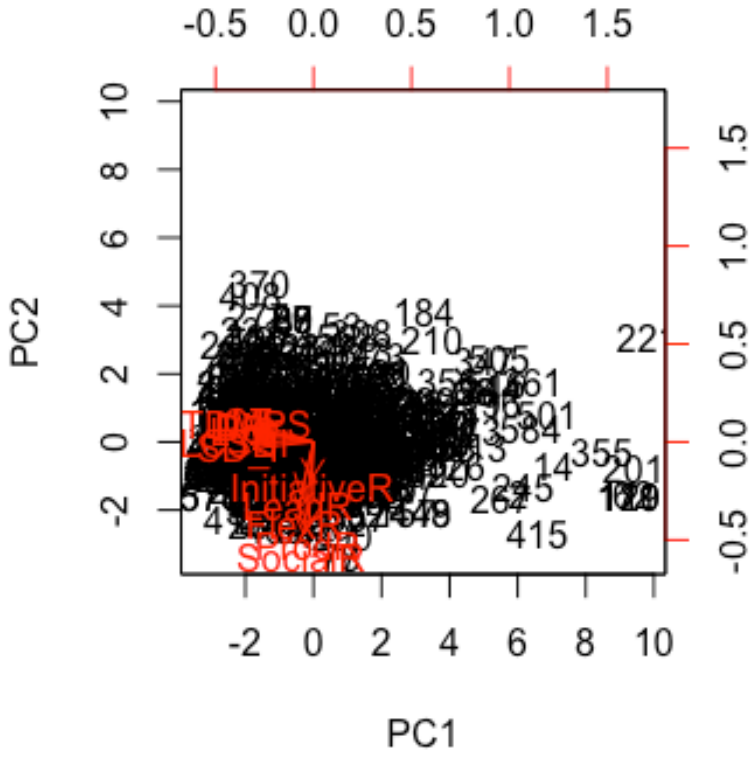


Part 4: PCA/ Factor Analysis

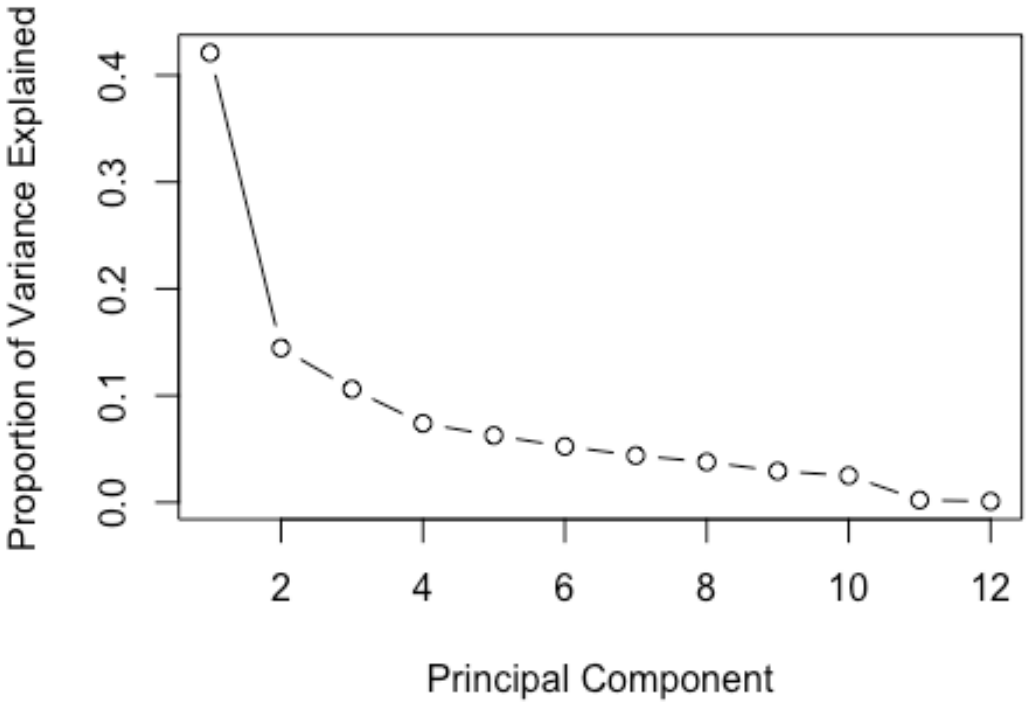
```
M3 <- dplyr::select(M2, -Total.Good.Decisions, - episodes)

## [1] "sdev"     "rotation" "center"   "scale"    "x"

##                       PC1          PC2          PC3        PC4
PC5
## SocialR     -0.063957141 -0.583574506  0.154750068  0.2861317
0.08498418
## ProdR       -0.029387599 -0.530364323 -0.005369975 -0.4710536 -
0.22626496
## LeadR       -0.081233370 -0.331009163 -0.506083973  0.2151349
0.68128738
## InitiativeR -0.007073981 -0.230435134 -0.655204124 -0.1645391 -
0.50616687
## FlexR       -0.095295922 -0.425240828  0.473634440  0.2955227 -
0.21948292
## LCSDI       -0.403524618 -0.008444935  0.108484343 -0.3404451
```

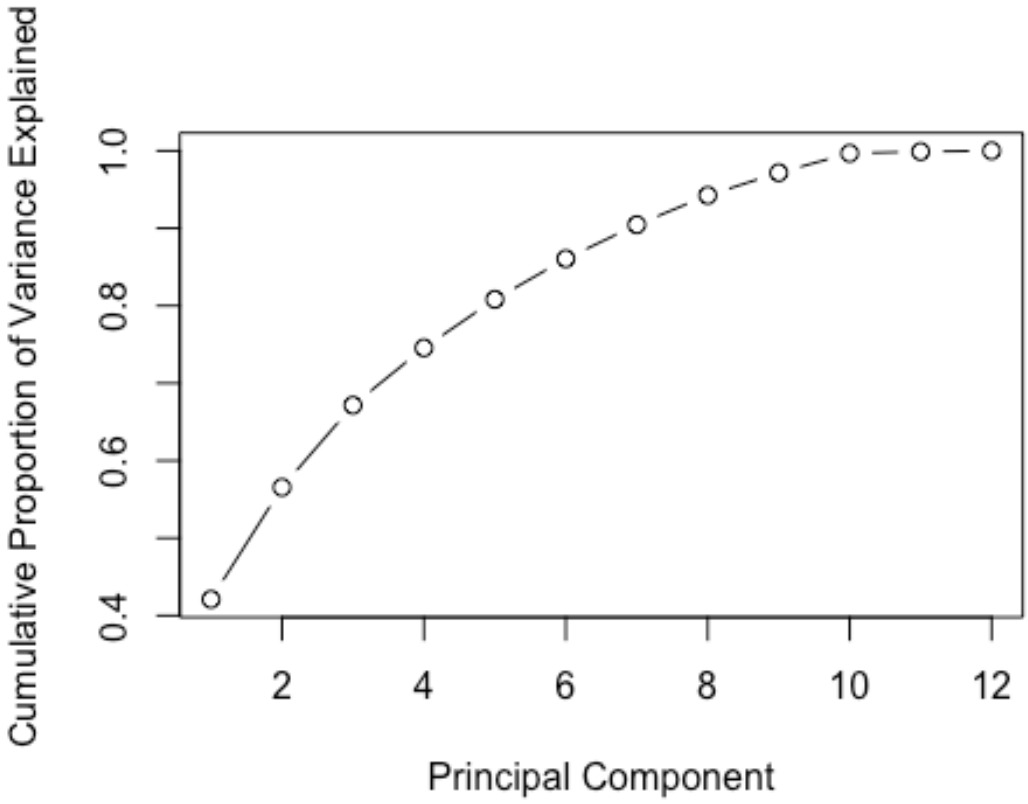
```
0.17514817
## CTDMPS      -0.409393313  0.091068304 -0.106015054  0.2585721 -
0.18001923
## L_C         -0.354979475  0.035948240  0.132445189 -0.4044855
0.16610443
## SD_I        -0.383800865 -0.041016635  0.076641876 -0.2319667
0.13983783
## CT          -0.337271237  0.108205764 -0.078654933  0.2776632 -
0.21311376
## DM          -0.355864875  0.085245360 -0.070815416  0.1344264 -
0.09762329
## PS          -0.367662085  0.065898791 -0.093034366  0.2005009 -
0.08874023
##                     PC6          PC7         PC8          PC9
PC10
## SocialR      0.07925342 -0.671748068  0.28942994 -0.02213044
0.02123244
## ProdR       -0.63674729  0.120062186 -0.09977762 -0.11277129
0.04667925
## LeadR       -0.05274325  0.322364139 -0.06431972  0.05753089
0.05516684
## InitiativeR  0.47297488 -0.014170824  0.04167388  0.08896486 -
0.02034588
## FlexR        0.32410060  0.531529735 -0.20566677  0.13874788
0.02970926
## LCSDI        0.19823684  0.001113726  0.06059578 -0.01994537 -
0.07983192
## CTDMPS      -0.15172809  0.014910666 -0.01388630 -0.12754330
0.10136398
## L_C          0.21009669 -0.011874972  0.16546993  0.19897104
0.62271397
## SD_I         0.15875210  0.011164289  0.00660373 -0.19229916 -
0.70981455
## CT          -0.24762333  0.273792200  0.68217722 -0.05960603 -
0.01070190
## DM          -0.25232347 -0.211317497 -0.32131747  0.75372617 -
0.15426584
## PS           0.00984595 -0.166101830 -0.50813672 -0.53984051
0.24669940
##                    PC11         PC12
## SocialR      0.006563060 -0.005397045
## ProdR       -0.002239230  0.003862368
## LeadR       -0.001157151  0.009248979
## InitiativeR -0.017444034 -0.001842573
## FlexR       -0.015580159  0.003564157
## LCSDI       -0.076917176 -0.789360400
## CTDMPS       0.810402418 -0.082870098
## L_C          0.037086964  0.404421623
## SD_I         0.059932649  0.449443342
## CT          -0.374160529  0.023020646
```

```
## DM          -0.172429466  0.016663833
## PS          -0.402541699  0.059440878
```




```
## Importance of components:
##                           PC1    PC2    PC3    PC4     PC5     PC6
PC7
## Standard deviation     2.248 1.3169 1.1282 0.9424 0.86721 0.79303
0.72589
## Proportion of Variance 0.421 0.1445 0.1061 0.0740 0.06267 0.05241
0.04391
## Cumulative Proportion  0.421 0.5655 0.6716 0.7456 0.80827 0.86067
0.90458
##                            PC8     PC9    PC10    PC11    PC12
## Standard deviation     0.67415 0.59273 0.54823 0.16217 0.11104
## Proportion of Variance 0.03787 0.02928 0.02505 0.00219 0.00103
## Cumulative Proportion  0.94246 0.97173 0.99678 0.99897 1.00000

##  [1] 0.420996485 0.144520418 0.106073831 0.074004067 0.062671008
##  [6] 0.052408225 0.043910277 0.037872631 0.029277359 0.025046774
## [11] 0.002191481 0.001027445          NA          NA          NA
## [16]          NA          NA          NA          NA          NA
```

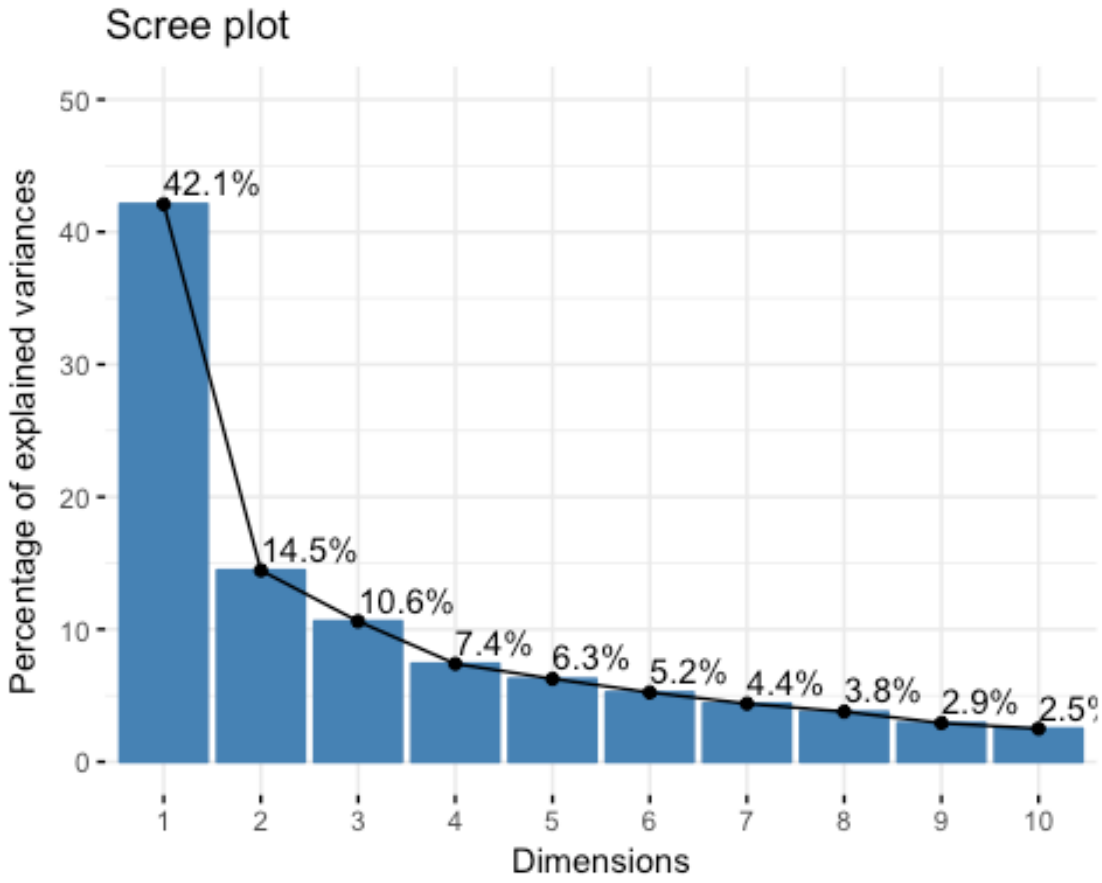

Proportion of Variance Explained
0.0
0.1
0.2
0.3
0.4
2
4
6
8
10
12
Principal Component



Rerunning the PCA with a different package

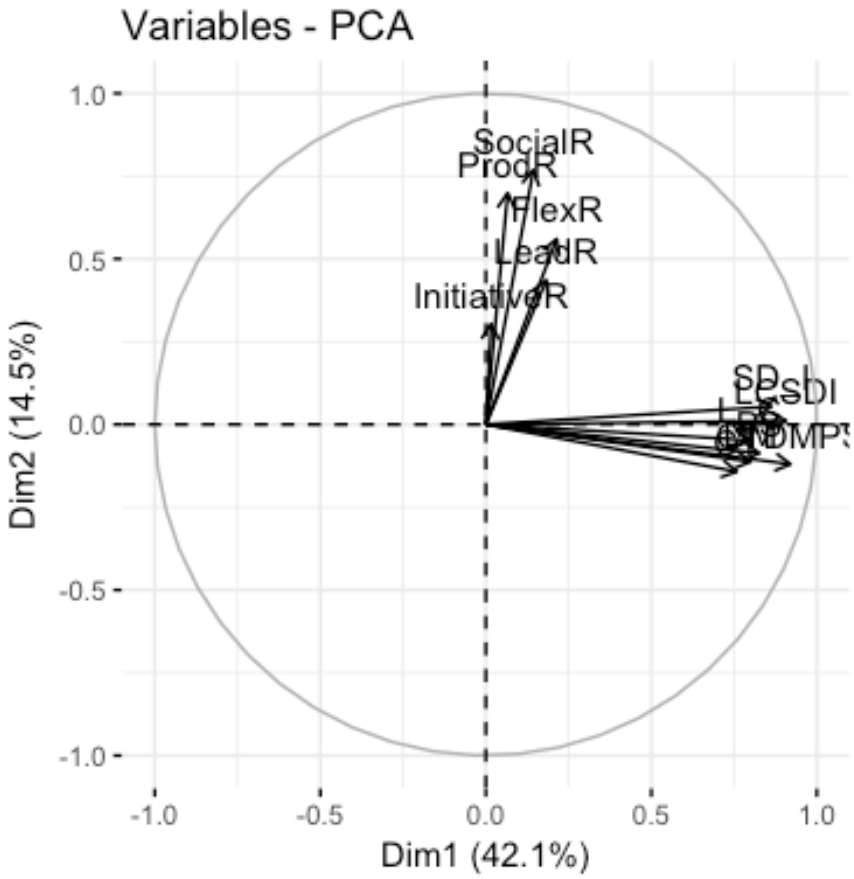
```
## Welcome! Related Books: `Practical Guide To Cluster Analysis in R`
at https://goo.gl/13EFCZ

## **Results for the Principal Component Analysis (PCA)**
## The analysis was performed on 543 individuals, described by 12
variables
## *The results are available in the following objects:
##
##    name               description
## 1  "$eig"             "eigenvalues"
## 2  "$var"             "results for the variables"
## 3  "$var$coord"       "coord. for the variables"
## 4  "$var$cor"         "correlations variables - dimensions"
## 5  "$var$cos2"        "cos2 for the variables"
## 6  "$var$contrib"     "contributions of the variables"
## 7  "$ind"             "results for the individuals"
## 8  "$ind$coord"       "coord. for the individuals"
## 9  "$ind$cos2"        "cos2 for the individuals"
## 10 "$ind$contrib"     "contributions of the individuals"
## 11 "$call"            "summary statistics"
## 12 "$call$centre"     "mean of the variables"
```

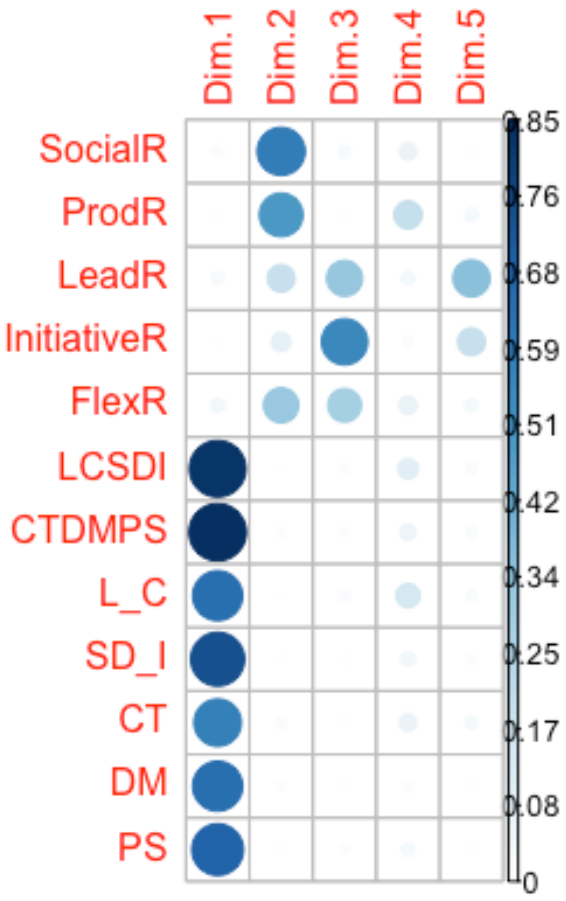
```
## 13 "$call$ecart.type" "standard error of the variables"
## 14 "$call$row.w"      "weights for the individuals"
## 15 "$call$col.w"      "weights for the variables"

##        eigenvalue variance.percent cumulative.variance.percent
## Dim.1  5.05195782       42.0996485                    42.09965
## Dim.2  1.73424501       14.4520418                    56.55169
## Dim.3  1.27288597       10.6073831                    67.15907
## Dim.4  0.88804880        7.4004067                    74.55948
## Dim.5  0.75205209        6.2671008                    80.82658
## Dim.6  0.62889870        5.2408225                    86.06740
## Dim.7  0.52692332        4.3910277                    90.45843
## Dim.8  0.45447157        3.7872631                    94.24569
## Dim.9  0.35132831        2.9277359                    97.17343
## Dim.10 0.30056129        2.5046774                    99.67811
## Dim.11 0.02629777        0.2191481                    99.89726
## Dim.12 0.01232934        0.1027445                   100.00000
```



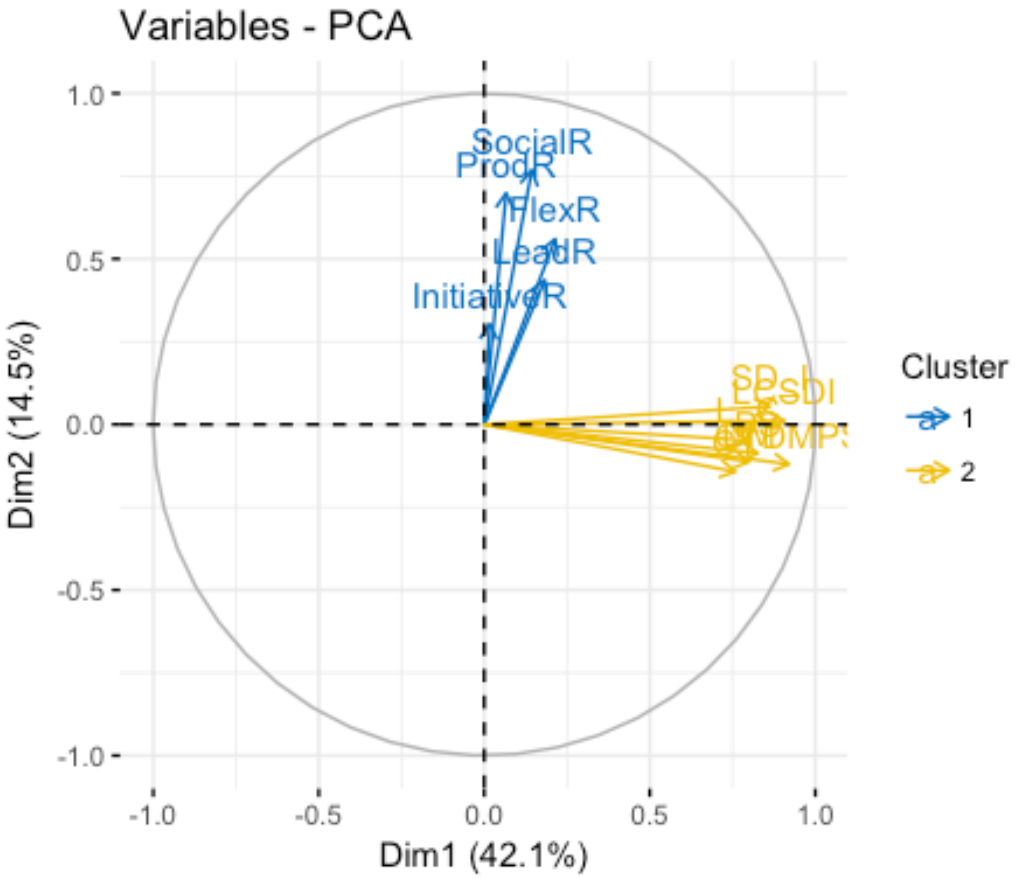

```
## Principal Component Analysis Results for variables
##  ===================================================
##   Name       Description
## 1 "$coord"   "Coordinates for the variables"
## 2 "$cor"     "Correlations between variables and dimensions"
```

```
## 3 "$cos2"    "Cos2 for the variables"
## 4 "$contrib" "contributions of the variables"

##                  Dim.1       Dim.2        Dim.3      Dim.4
Dim.5
## SocialR     0.14375366  0.76851357 -0.174592507  0.2696400 -
0.07369908
## ProdR       0.06605322  0.69844068  0.006058526 -0.4439037
0.19621909
## LeadR       0.18258468  0.43590841  0.570975318  0.2027352 -
0.59081880
## InitiativeR 0.01589988  0.30346173  0.739216025 -0.1550556
0.43895266
## FlexR       0.21419246  0.56000278 -0.534365025  0.2784898
0.19033764
## LCSDI       0.90698456  0.01112120 -0.122394475 -0.3208230 -
0.15189013
## CTDMPS      0.92017537 -0.11992852  0.119608568  0.2436689
0.15611437
## L_C         0.79787177 -0.04734050 -0.149427640 -0.3811723 -
0.14404732
## SD_I        0.86265234  0.05401511 -0.086469088 -0.2185969 -
0.12126867
```




Dim.1
Dim.2
Dim.3
Dim.4
Dim.5
SocialR
ProdR
LeadR
InitiativeR
FlexR
LCSDI
CTDMPS
L_C
SD_I
CT
DM
PS
0.85
0.76
0.68
0.59
0.51
0.42
0.34
0.25
0.17
0.08
0

How the variables cluster together




```
## $quanti
##          correlation       p.value
## CTDMPS     0.9201754 1.749361e-222
## LCSDI      0.9069846 2.543441e-205
## SD_I       0.8626523 2.820533e-162
## PS         0.8263779 4.909111e-137
## DM         0.7998618 4.826213e-122
## L_C        0.7978718 5.212894e-121
## CT         0.7580697 1.679972e-102
## FlexR      0.2141925  4.697420e-07
## LeadR      0.1825847  1.861506e-05
## SocialR    0.1437537  7.807099e-04

## $quanti
##              correlation       p.value
## SocialR        0.7685136 5.384773e-107
## ProdR          0.6984407  1.227815e-80
## FlexR          0.5600028  3.791730e-46
## LeadR          0.4359084  1.365392e-26
## InitiativeR    0.3034617  4.968027e-13
## PS            -0.0867826  4.323898e-02
```

```
## DM           -0.1122602  8.839992e-03
## CTDMPS       -0.1199285  5.137501e-03
## CT           -0.1424970  8.688620e-04
```

Part 5: Regression

Regression LCSDI

the varibles that make up majority of PC1 as it relates to LCSDI (External1) I will run a regression on the variables taht have over 75% correlation to PC1

```
##
## Call:
## lm(formula = LCSDI ~ +FlexR + Total.Good.Decisions + episodes,
##     data = M2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11.9456  -1.6096   0.5131   2.3567   4.8975
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          16.41690    0.28725  57.152  < 2e-16 ***
## FlexR                 2.28589    0.70548   3.240  0.00127 **
## Total.Good.Decisions  0.02943    0.01664   1.769  0.07748 .
## episodes             -0.17515    0.07960  -2.200  0.02821 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.024 on 539 degrees of freedom
## Multiple R-squared:  0.04148,    Adjusted R-squared:  0.03614
## F-statistic: 7.775 on 3 and 539 DF,  p-value: 4.33e-05

##
## Call:
## lm(formula = LCSDI ~ SocialR + FlexR + Total.Good.Decisions +
##     episodes, data = M2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -11.9593  -1.6117   0.5079   2.3485   4.9375
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          16.30385    0.45728  35.654  < 2e-16 ***
## SocialR               0.23931    0.75276   0.318  0.75067
```

```
## FlexR                 2.24654    0.71684   3.134  0.00182 **
## Total.Good.Decisions  0.02775    0.01747   1.589  0.11274
## episodes             -0.16960    0.08156  -2.079  0.03805 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.027 on 538 degrees of freedom
## Multiple R-squared:  0.04166,    Adjusted R-squared:  0.03453
## F-statistic: 5.847 on 4 and 538 DF,  p-value: 0.0001305
```

the varibles that make up majority of PC1 as it relates to CTDMPS (External2) I will run a regression on the variables taht have over 75% correlation to PC1

```
##
## Call:
## lm(formula = CTDMPS ~ +FlexR + Total.Good.Decisions + episodes,
##     data = M2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -12.0053  -1.5096   0.3567   2.2744   4.9770
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          16.44989    0.28980  56.763  < 2e-16 ***
## FlexR                 2.42426    0.71175   3.406 0.000708 ***
## Total.Good.Decisions  0.02593    0.01678   1.545 0.122980
## episodes             -0.22877    0.08031  -2.849 0.004560 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.051 on 539 degrees of freedom
## Multiple R-squared:  0.03765,    Adjusted R-squared:  0.03229
## F-statistic: 7.029 on 3 and 539 DF,  p-value: 0.0001212

##
## Call:
## lm(formula = CTDMPS ~ SocialR + FlexR + Total.Good.Decisions +
##     episodes, data = M2)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -12.0109  -1.5081   0.3574   2.2761   4.9734
##
## Coefficients:
##                      Estimate Std. Error t value Pr(>|t|)
## (Intercept)          16.45955    0.46139  35.674  < 2e-16 ***
## SocialR              -0.02045    0.75952  -0.027 0.978534
## FlexR                 2.42762    0.72328   3.356 0.000845 ***
## Total.Good.Decisions  0.02607    0.01762   1.479 0.139646
```

```
## episodes             -0.22924    0.08229  -2.786 0.005530 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.054 on 538 degrees of freedom
## Multiple R-squared:  0.03765,    Adjusted R-squared:  0.0305
## F-statistic: 5.262 on 4 and 538 DF,  p-value: 0.0003654
```