Canopy Exploration

Gregor Thomas

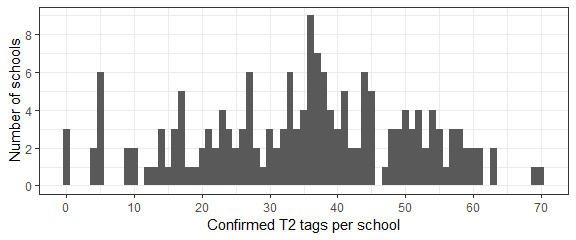
January 22, 2020

This is a working document for exploring the Canopy data and is intendend to provide directional information and to guide ongoing discussions, including whether this is the direction the client would like us to further pursue.

*The information below is a draft and will be continued to be reviewd and revised.*

# Descriptives

In the confirmation data, there are 76 tier 2 (T2) tags and responses from 173 schools. The graph below shows the distribution of the number of confirmed T2 tags per school. There are a handful (3) schools with no confirmed tags, and one school each with 69 and 70 tags (Avalon School and Meadows Valley School PK-12, respectively); 50% of schools have between 24 and 47 tags, with the median school having 36 tags.



# Nomination vs Confirmation Divergence

The tag confirmations do not diverge far from the nominations. Schools much more frequently *confirmed tags for which they were not nominated* than *disconfirmed tags for which they were nominated*. Detailed metrics follow. Overall, the agreement between nominations and confirmations are very high.

In this section (and throughout this analysis, so far) we use de-duplicated nominations. That is, if multiple nominators suggested the same tag for a school, it is counted as a single nomination. This keeps the scale of the analysis at the tag-school level, without introducing complexity of considering nominators as well. Additional analysis could be done including the individual nominator data (34 schools were nominated by multiple individual), to see if duplicated nominations are more likely to be confirmed, to assess the “accuracy” of individual nominators, etc.

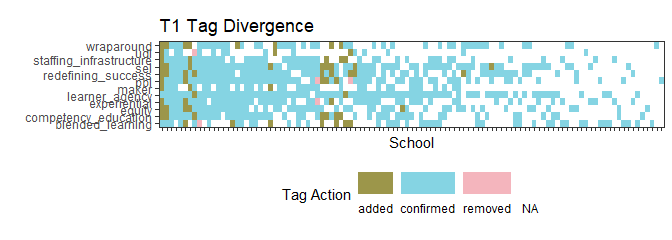
Considering all tags (tiers 1 and 2), the overall agreement between nomination and confirmation was 95.7%. By school, 72.3% did not make any changes to their nominations. One school, Minnesota New Country School, was nominated for 64 T2 tags, but did not confirm (or add) any T2 tags, so we are ignoring it’s T2 confirmation data.

In the confirmation process, schools were much more likely to add tags they were not nominated for than to remove tags they were nominated for. Several summary statistics are provided in the table below, broken out by tag tier. Graphical illustrations follow.

| tier | accuracy | precision | sensitivity | n\_nom\_confirmed | n\_tag\_added | n\_tag\_removed |
| --- | --- | --- | --- | --- | --- | --- |
| T1 | 0.947 | 0.990 | 0.908 | 998 | 101 | 10 |
| T2 | 0.961 | 0.992 | 0.915 | 1916 | 178 | 16 |

The technical terms in the table are borrowed from data science. *Accuracy* is the proportion of matches between nomination and confirmation (both nominated and confirmed or neither nominated nor confirmed count as matches). *Precision* (aka *positive predictive value*) is the proportion of (positive) nominations that were confirmed. *Sensitivity* is the proportion of (positive) confirmations that were nominated. Then we have three counts: *n nom confirmed* is the number of tag nomination that were confirmed, *n tag added* is the number of tags schools confirmed that were not nominated, and *n tag removed* is the paltry number of nominations that schools did not confirm.

The high precision values, especially high for Tier 1 tags, is a proportional way to measure how small the number of disconfirmed tags are relative to confirmed tags. Sensitivity is similar, but for added tags rather than removed tags.





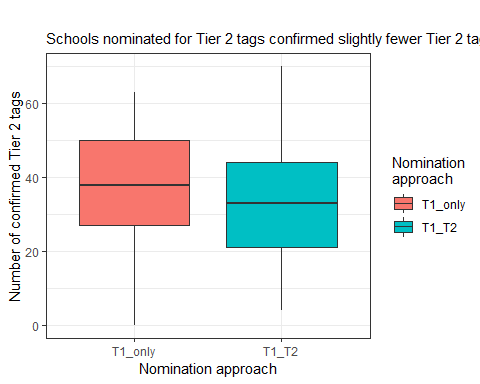
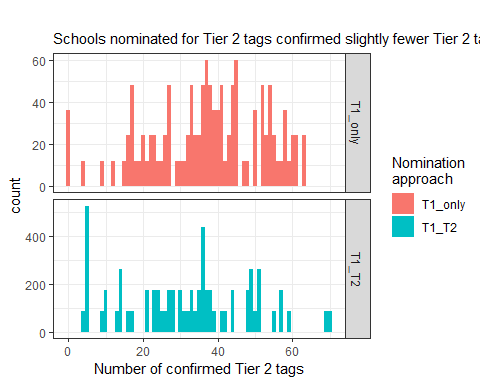
Individual tag statistics are in the tables below. All Tier 1 tags are presented and the top and bottom most added Tier 2 tags.

| tier | tag | n\_nom\_confirmed | n\_tag\_added | n\_tag\_removed |
| --- | --- | --- | --- | --- |
| T1 | redefining\_success | 93 | 13 | 0 |
| T1 | wraparound | 69 | 12 | 1 |
| T1 | sel | 109 | 11 | 0 |
| T1 | competency\_education | 82 | 11 | 0 |
| T1 | learner\_agency | 122 | 9 | 0 |
| T1 | equity | 91 | 9 | 0 |
| T1 | blended\_learning | 80 | 9 | 2 |
| T1 | pbl | 100 | 8 | 2 |
| T1 | staffing\_infrastructure | 77 | 6 | 0 |
| T1 | maker | 53 | 5 | 2 |
| T1 | udl | 36 | 5 | 2 |
| T1 | experiential | 86 | 3 | 1 |

Most and least added Tier 2 tags:

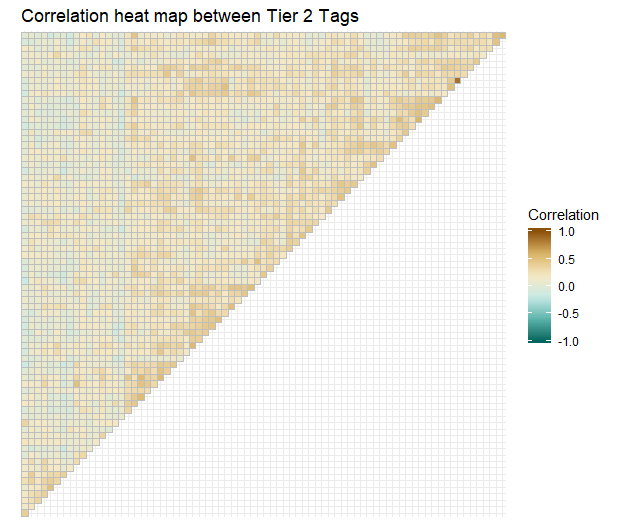
| tier | tag | n\_nom\_confirmed | n\_tag\_added | n\_tag\_removed |
| --- | --- | --- | --- | --- |
| T2 | advisories | 27 | 6 | 1 |
| T2 | mental\_health | 18 | 6 | 0 |
| T2 | exhibitions | 38 | 5 | 0 |
| T2 | sel\_plan | 37 | 5 | 0 |
| T2 | learning\_paths | 31 | 5 | 0 |
| T2 | integrated\_data | 18 | 0 | 0 |
| T2 | enriched\_virtual | 11 | 0 | 0 |
| T2 | individual\_rotation | 10 | 0 | 0 |
| T2 | a\_la\_carte | 6 | 0 | 0 |
| T2 | lab\_rotation | 4 | 0 | 0 |

With this apparent reluctance of schools administrators to disconfirm tags for which they were nominated, it seems natural to ask if schools that were nominated for tier 2 tags ended up confirming more tags, on average, than those that were not nominated at the tier 2 level. As it turns out, this was not the case. Schools that were only nominated at the Tier 1 level selected, on average, 37.1121495 Tier 2 tags, while schools nominated at the Tier 2 level selected 31.7272727 Tier 2 tags.

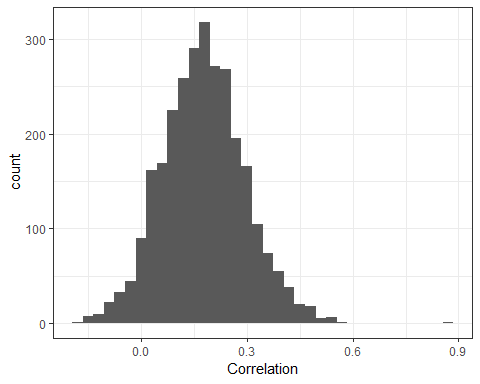


# Clustering

To understand the relationship between Tier 2 tags, we begin by looking at a heat map of correlations. The rows and columns are ordered to cluster similar correlations together, hence the more blue on the left side, and higher correlations on the right.



Looking at the distribution of correlations, we see more-or-less a bell curve, with a mean of 0.18, and one outlier pair, measures\_sel and measures\_climate, with an extremely high correlation of 0.87. This is a robust outlier, with 99 schools confirming measures\_sel, 96 confirming measures\_climate, and 92 of those overlapping.



The table below shows the most and least correlated tags (top and bottom 6).

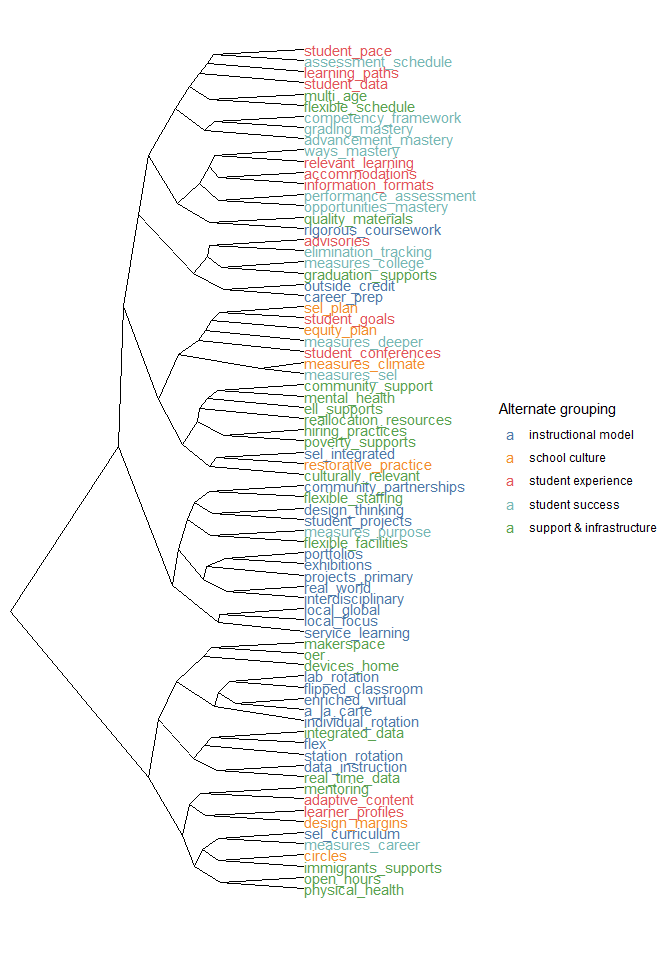
| Var1 | Var2 | Correlation |
| --- | --- | --- |
| measures\_sel | measures\_climate | 0.871 |
| exhibitions | portfolios | 0.572 |
| interdisciplinary | real\_world | 0.547 |
| local\_focus | local\_global | 0.546 |
| poverty\_supports | hiring\_practices | 0.538 |
| graduation\_supports | measures\_college | 0.538 |
| station\_rotation | advisories | -0.142 |
| flipped\_classroom | advisories | -0.143 |
| enriched\_virtual | student\_goals | -0.145 |
| enriched\_virtual | sel\_plan | -0.149 |
| station\_rotation | design\_margins | -0.159 |
| flipped\_classroom | flexible\_schedule | -0.166 |

# Clustering Methods

We’ll try a few clustering methods to explore the nuances they each give us and make sure our results are robust. First, hierarchical agglomerative clustering, then exploratory factor analysis. We will also look at the data as a network graph with weighted edges, and use community detection (as if it was a social network).

For now, we’ll focus on the confirmed data.

### Hierarchical clustering



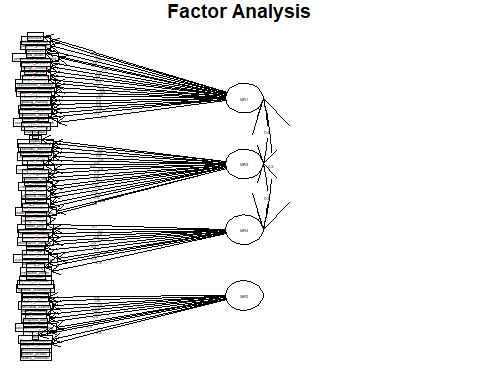
## Exploratory Factor Analysis

With EFA, we first need to run diagnostics to select the optimal number of clusters.

The principal axis method and minimum residual methods recommend 4 clusters, but 5 and 6 clusters are also fairly close. We’ll start with 5 clusters and explore more as needed.

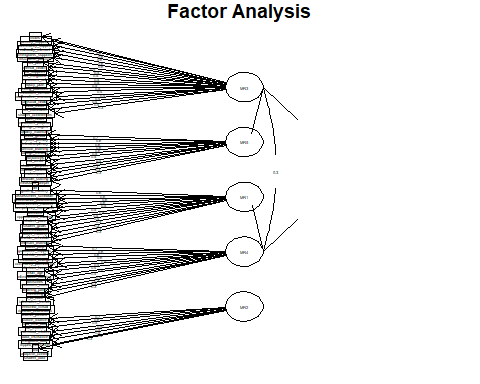
## Loading required namespace: GPArotation

##   
## Loadings:  
## MR1 MR3 MR4 MR2   
## station\_rotation 0.567  
## flipped\_classroom 0.328  
## lab\_rotation 0.519  
## individual\_rotation 0.542  
## flex 0.356  
## a\_la\_carte   
## enriched\_virtual   
## opportunities\_mastery 0.425   
## advancement\_mastery 0.401  
## performance\_assessment 0.573   
## grading\_mastery 0.371   
## assessment\_schedule 0.425   
## competency\_framework 0.304   
## equity\_plan 0.411   
## reallocation\_resources 0.374   
## design\_margins   
## restorative\_practice 0.545   
## culturally\_relevant 0.593   
## rigorous\_coursework   
## elimination\_tracking 0.446   
## graduation\_supports 0.676   
## poverty\_supports 0.554   
## immigrants\_supports 0.527   
## ell\_supports 0.498   
## flexible\_staffing   
## flexible\_facilities 0.366   
## flexible\_schedule   
## real\_time\_data 0.616  
## quality\_materials   
## oer   
## multi\_age 0.426   
## devices\_home 0.403   
## integrated\_data 0.446  
## student\_goals 0.320   
## student\_pace 0.441  
## learning\_paths 0.387   
## learner\_profiles   
## student\_conferences 0.395 0.318   
## student\_data 0.363  
## projects\_primary 0.647   
## student\_projects 0.508   
## interdisciplinary 0.677   
## real\_world 0.579   
## exhibitions 0.593   
## portfolios 0.716   
## career\_prep 0.702   
## outside\_credit 0.604   
## service\_learning 0.469   
## local\_focus 0.433   
## local\_global 0.484   
## design\_thinking 0.505   
## community\_partnerships 0.308 0.395   
## makerspace   
## measures\_college 0.609   
## measures\_career 0.321   
## measures\_deeper 0.334   
## measures\_purpose 0.356   
## measures\_sel 0.502   
## measures\_climate 0.466   
## sel\_plan 0.530   
## sel\_curriculum 0.384   
## sel\_integrated 0.509   
## circles 0.727   
## advisories 0.430   
## hiring\_practices 0.401   
## relevant\_learning 0.371   
## information\_formats   
## ways\_mastery 0.441   
## accommodations   
## data\_instruction 0.533  
## adaptive\_content 0.321  
## mentoring 0.304 0.323   
## mental\_health 0.534   
## physical\_health 0.431   
## community\_support 0.620   
## open\_hours 0.318   
##   
## MR1 MR3 MR4 MR2  
## SS loadings 6.213 5.872 4.442 3.944  
## Proportion Var 0.082 0.077 0.058 0.052  
## Cumulative Var 0.082 0.159 0.217 0.269

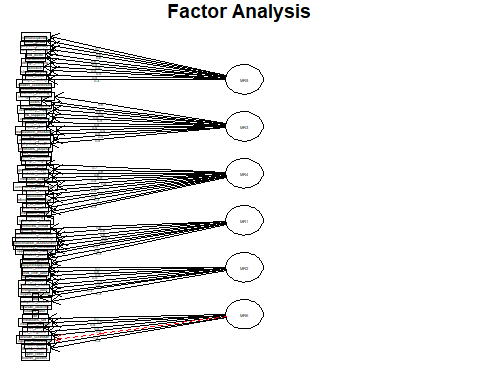


## Factor Analysis using method = minres  
## Call: fa(r = conf\_cor, nfactors = 5, rotate = "oblimin", fm = "minres")  
## Standardized loadings (pattern matrix) based upon correlation matrix  
## item MR3 MR5 MR1 MR4 MR2 h2 u2 com  
## circles 63 0.71 0.14 -0.09 -0.12 -0.10 0.508 0.49 1.2  
## poverty\_supports 22 0.62 -0.18 0.19 0.09 0.08 0.510 0.49 1.5  
## community\_support 75 0.60 -0.02 -0.17 0.22 0.12 0.468 0.53 1.5  
## culturally\_relevant 18 0.59 0.08 -0.02 0.02 -0.03 0.383 0.62 1.1  
## immigrants\_supports 23 0.57 -0.16 0.06 0.13 -0.05 0.366 0.63 1.3  
## restorative\_practice 17 0.56 0.13 0.09 -0.02 -0.11 0.397 0.60 1.2  
## sel\_plan 60 0.55 0.04 0.11 -0.01 0.11 0.393 0.61 1.2  
## mental\_health 73 0.54 -0.03 -0.03 0.21 0.03 0.386 0.61 1.3  
## ell\_supports 24 0.50 -0.06 0.00 0.09 0.22 0.355 0.65 1.5  
## sel\_integrated 62 0.50 0.20 0.03 -0.03 -0.02 0.342 0.66 1.3  
## measures\_sel 58 0.47 0.31 0.05 -0.15 0.14 0.419 0.58 2.2  
## equity\_plan 14 0.45 0.06 0.22 0.10 -0.03 0.376 0.62 1.6  
## hiring\_practices 65 0.45 -0.04 0.25 0.15 0.11 0.440 0.56 2.0  
## measures\_climate 59 0.43 0.30 -0.01 -0.07 0.15 0.359 0.64 2.1  
## reallocation\_resources 15 0.42 -0.10 0.22 -0.02 0.13 0.288 0.71 1.9  
## physical\_health 74 0.42 -0.02 -0.08 0.08 0.13 0.215 0.79 1.4  
## local\_focus 49 0.39 0.36 -0.09 0.04 -0.04 0.349 0.65 2.2  
## sel\_curriculum 61 0.37 0.16 -0.01 -0.15 0.05 0.174 0.83 1.8  
## student\_conferences 38 0.33 0.29 0.21 -0.17 -0.02 0.310 0.69 3.3  
## open\_hours 76 0.30 0.09 -0.06 0.17 0.09 0.179 0.82 2.1  
## measures\_purpose 57 0.29 0.19 0.29 0.04 -0.02 0.337 0.66 2.8  
## design\_margins 16 0.21 -0.04 0.10 0.13 -0.07 0.095 0.91 2.5  
## quality\_materials 29 0.16 0.01 0.10 0.07 0.16 0.103 0.90 3.0  
## local\_global 50 0.21 0.66 -0.15 0.04 -0.05 0.521 0.48 1.3  
## projects\_primary 40 -0.05 0.64 0.11 0.01 -0.04 0.445 0.55 1.1  
## interdisciplinary 42 0.04 0.60 0.21 0.00 -0.01 0.490 0.51 1.2  
## service\_learning 48 -0.03 0.58 -0.05 0.18 0.12 0.408 0.59 1.3  
## design\_thinking 51 -0.01 0.56 0.04 -0.02 0.24 0.381 0.62 1.4  
## exhibitions 44 0.08 0.47 0.24 0.11 -0.21 0.451 0.55 2.1  
## real\_world 43 0.06 0.46 0.26 0.12 -0.09 0.423 0.58 1.9  
## student\_projects 41 0.02 0.44 0.18 0.15 -0.02 0.340 0.66 1.6  
## flexible\_facilities 26 0.11 0.35 0.12 0.01 0.30 0.315 0.69 2.5  
## makerspace 53 -0.07 0.35 -0.07 0.12 0.13 0.143 0.86 1.7  
## flexible\_staffing 25 0.15 0.35 -0.01 0.19 0.03 0.254 0.75 2.0  
## measures\_deeper 56 0.13 0.32 0.09 0.27 0.04 0.325 0.67 2.5  
## oer 30 0.07 0.27 -0.02 0.21 0.25 0.242 0.76 3.0  
## grading\_mastery 11 0.10 -0.04 0.65 -0.02 -0.13 0.432 0.57 1.1  
## assessment\_schedule 12 -0.07 0.04 0.63 0.10 0.09 0.457 0.54 1.1  
## performance\_assessment 10 0.04 0.22 0.59 0.00 -0.03 0.480 0.52 1.3  
## advancement\_mastery 9 0.00 -0.17 0.58 -0.06 0.19 0.359 0.64 1.4  
## competency\_framework 13 -0.02 -0.04 0.54 0.10 -0.05 0.306 0.69 1.1  
## portfolios 45 -0.03 0.43 0.51 -0.08 -0.08 0.504 0.50 2.1  
## opportunities\_mastery 8 0.02 0.13 0.50 0.01 0.13 0.351 0.65 1.3  
## student\_pace 35 -0.01 -0.07 0.41 0.10 0.30 0.317 0.68 2.0  
## student\_goals 34 0.17 0.07 0.41 0.06 0.03 0.295 0.71 1.5  
## accommodations 69 0.23 0.01 0.34 0.16 0.15 0.357 0.64 2.7  
## ways\_mastery 68 -0.01 0.26 0.34 0.25 0.05 0.370 0.63 2.8  
## flexible\_schedule 27 0.12 0.05 0.31 0.20 0.01 0.241 0.76 2.1  
## relevant\_learning 66 0.20 0.21 0.31 0.11 0.12 0.357 0.64 3.3  
## career\_prep 46 -0.09 0.11 -0.05 0.75 0.00 0.552 0.45 1.1  
## graduation\_supports 21 0.21 -0.10 0.14 0.62 0.02 0.567 0.43 1.4  
## outside\_credit 47 -0.06 0.13 0.04 0.61 -0.09 0.418 0.58 1.2  
## measures\_college 54 0.18 -0.08 0.07 0.58 0.04 0.454 0.55 1.3  
## community\_partnerships 52 0.07 0.42 -0.09 0.46 -0.12 0.478 0.52 2.3  
## devices\_home 32 0.00 -0.04 -0.01 0.42 0.23 0.249 0.75 1.6  
## multi\_age 31 -0.03 0.10 0.23 0.39 -0.03 0.281 0.72 1.8  
## elimination\_tracking 20 0.22 -0.02 0.21 0.38 -0.15 0.339 0.66 2.7  
## advisories 64 0.31 0.04 0.12 0.37 -0.27 0.390 0.61 3.1  
## measures\_career 55 0.16 0.20 -0.07 0.36 -0.02 0.251 0.75 2.1  
## learning\_paths 36 0.00 0.05 0.29 0.35 0.15 0.329 0.67 2.4  
## mentoring 72 0.29 0.07 -0.06 0.34 0.10 0.289 0.71 2.3  
## a\_la\_carte 6 -0.14 0.01 -0.01 0.32 0.23 0.161 0.84 2.2  
## information\_formats 67 0.08 0.12 0.21 0.25 0.18 0.269 0.73 3.6  
## enriched\_virtual 7 -0.09 -0.07 -0.10 0.24 0.20 0.098 0.90 2.8  
## rigorous\_coursework 19 0.09 0.07 0.11 0.23 0.15 0.159 0.84 2.9  
## learner\_profiles 37 0.10 0.12 0.18 0.20 0.19 0.237 0.76 4.2  
## station\_rotation 1 0.15 0.06 -0.12 -0.21 0.66 0.472 0.53 1.4  
## real\_time\_data 28 0.06 -0.12 0.13 -0.01 0.57 0.384 0.62 1.2  
## lab\_rotation 3 -0.21 0.20 0.12 0.09 0.55 0.379 0.62 1.8  
## individual\_rotation 4 -0.07 -0.04 0.07 -0.01 0.54 0.297 0.70 1.1  
## data\_instruction 70 0.17 -0.02 0.07 -0.05 0.52 0.339 0.66 1.3  
## integrated\_data 33 0.11 -0.09 -0.06 0.28 0.48 0.368 0.63 1.8  
## flipped\_classroom 2 -0.19 0.06 -0.10 0.19 0.41 0.212 0.79 2.1  
## flex 5 0.06 -0.05 0.05 0.07 0.35 0.152 0.85 1.2  
## adaptive\_content 71 0.12 0.13 0.15 0.00 0.30 0.199 0.80 2.3  
## student\_data 39 0.11 -0.10 0.21 0.23 0.29 0.269 0.73 3.4  
##   
## MR3 MR5 MR1 MR4 MR2  
## SS loadings 6.95 5.23 5.08 4.95 3.70  
## Proportion Var 0.09 0.07 0.07 0.07 0.05  
## Cumulative Var 0.09 0.16 0.23 0.29 0.34  
## Proportion Explained 0.27 0.20 0.20 0.19 0.14  
## Cumulative Proportion 0.27 0.47 0.67 0.86 1.00  
##   
## With factor correlations of   
## MR3 MR5 MR1 MR4 MR2  
## MR3 1.00 0.29 0.28 0.30 0.16  
## MR5 0.29 1.00 0.27 0.22 0.00  
## MR1 0.28 0.27 1.00 0.29 0.14  
## MR4 0.30 0.22 0.29 1.00 0.13  
## MR2 0.16 0.00 0.14 0.13 1.00  
##   
## Mean item complexity = 1.9  
## Test of the hypothesis that 5 factors are sufficient.  
##   
## The degrees of freedom for the null model are 2850 and the objective function was 46.95  
## The degrees of freedom for the model are 2480 and the objective function was 24.3   
##   
## The root mean square of the residuals (RMSR) is 0.06   
## The df corrected root mean square of the residuals is 0.06   
##   
## Fit based upon off diagonal values = 0.93  
## Measures of factor score adequacy   
## MR3 MR5 MR1 MR4 MR2  
## Correlation of (regression) scores with factors 0.95 0.94 0.93 0.94 0.92  
## Multiple R square of scores with factors 0.91 0.88 0.87 0.88 0.84  
## Minimum correlation of possible factor scores 0.81 0.77 0.75 0.76 0.68

##   
## Loadings:  
## MR3 MR5 MR1 MR4 MR2   
## station\_rotation 0.657  
## flipped\_classroom 0.410  
## lab\_rotation 0.549  
## individual\_rotation 0.540  
## flex 0.347  
## a\_la\_carte 0.325   
## enriched\_virtual   
## opportunities\_mastery 0.502   
## advancement\_mastery 0.576   
## performance\_assessment 0.589   
## grading\_mastery 0.647   
## assessment\_schedule 0.627   
## competency\_framework 0.537   
## equity\_plan 0.453   
## reallocation\_resources 0.424   
## design\_margins   
## restorative\_practice 0.562   
## culturally\_relevant 0.593   
## rigorous\_coursework   
## elimination\_tracking 0.376   
## graduation\_supports 0.623   
## poverty\_supports 0.619   
## immigrants\_supports 0.572   
## ell\_supports 0.501   
## flexible\_staffing 0.345   
## flexible\_facilities 0.348 0.303  
## flexible\_schedule 0.311   
## real\_time\_data 0.573  
## quality\_materials   
## oer 0.273   
## multi\_age 0.393   
## devices\_home 0.423   
## integrated\_data 0.276 0.484  
## student\_goals 0.410   
## student\_pace 0.413 0.298  
## learning\_paths 0.289 0.349   
## learner\_profiles   
## student\_conferences 0.325 0.292   
## student\_data 0.287  
## projects\_primary 0.641   
## student\_projects 0.441   
## interdisciplinary 0.601   
## real\_world 0.456   
## exhibitions 0.472   
## portfolios 0.426 0.505   
## career\_prep 0.749   
## outside\_credit 0.613   
## service\_learning 0.583   
## local\_focus 0.388 0.364   
## local\_global 0.658   
## design\_thinking 0.560   
## community\_partnerships 0.418 0.464   
## makerspace 0.347   
## measures\_college 0.579   
## measures\_career 0.355   
## measures\_deeper 0.325   
## measures\_purpose 0.295 0.292   
## measures\_sel 0.472 0.311   
## measures\_climate 0.428 0.298   
## sel\_plan 0.547   
## sel\_curriculum 0.366   
## sel\_integrated 0.500   
## circles 0.713   
## advisories 0.305 0.371 -0.272  
## hiring\_practices 0.451   
## relevant\_learning 0.306   
## information\_formats   
## ways\_mastery 0.338   
## accommodations 0.344   
## data\_instruction 0.523  
## adaptive\_content 0.298  
## mentoring 0.287 0.339   
## mental\_health 0.540   
## physical\_health 0.417   
## community\_support 0.600   
## open\_hours 0.297   
##   
## MR3 MR5 MR1 MR4 MR2  
## SS loadings 5.993 4.491 4.222 4.131 3.477  
## Proportion Var 0.079 0.059 0.056 0.054 0.046  
## Cumulative Var 0.079 0.138 0.194 0.248 0.294



##   
## Loadings:  
## MR5 MR3 MR4 MR1 MR2 MR6   
## station\_rotation 0.667   
## flipped\_classroom 0.450   
## lab\_rotation 0.528   
## individual\_rotation 0.527   
## flex 0.337   
## a\_la\_carte 0.352   
## enriched\_virtual   
## opportunities\_mastery 0.479   
## advancement\_mastery 0.582   
## performance\_assessment 0.302 0.556   
## grading\_mastery 0.627   
## assessment\_schedule 0.608   
## competency\_framework 0.523   
## equity\_plan 0.445   
## reallocation\_resources 0.416   
## design\_margins   
## restorative\_practice 0.389 0.352  
## culturally\_relevant 0.505   
## rigorous\_coursework -0.340  
## elimination\_tracking 0.356   
## graduation\_supports 0.609   
## poverty\_supports 0.568   
## immigrants\_supports 0.624   
## ell\_supports 0.521   
## flexible\_staffing 0.308  
## flexible\_facilities   
## flexible\_schedule 0.311 0.371  
## real\_time\_data 0.568   
## quality\_materials   
## oer   
## multi\_age 0.465 0.360  
## devices\_home 0.451   
## integrated\_data 0.491   
## student\_goals 0.399   
## student\_pace 0.413   
## learning\_paths 0.347   
## learner\_profiles   
## student\_conferences   
## student\_data   
## projects\_primary 0.603   
## student\_projects 0.453   
## interdisciplinary 0.697   
## real\_world 0.564   
## exhibitions 0.544   
## portfolios 0.470 0.460   
## career\_prep 0.735   
## outside\_credit 0.597   
## service\_learning 0.564   
## local\_focus 0.438 0.357   
## local\_global 0.670   
## design\_thinking 0.541   
## community\_partnerships 0.430 0.452   
## makerspace 0.320  
## measures\_college 0.549   
## measures\_career 0.329   
## measures\_deeper   
## measures\_purpose   
## measures\_sel 0.690  
## measures\_climate 0.620  
## sel\_plan 0.322 0.492  
## sel\_curriculum   
## sel\_integrated 0.414  
## circles 0.595   
## advisories 0.378   
## hiring\_practices 0.396   
## relevant\_learning   
## information\_formats   
## ways\_mastery 0.322 0.310   
## accommodations 0.334   
## data\_instruction 0.537   
## adaptive\_content 0.301   
## mentoring 0.329   
## mental\_health 0.454   
## physical\_health 0.360   
## community\_support 0.549   
## open\_hours   
##   
## MR5 MR3 MR4 MR1 MR2 MR6  
## SS loadings 4.644 4.547 4.081 3.909 3.455 3.066  
## Proportion Var 0.061 0.060 0.054 0.051 0.045 0.040  
## Cumulative Var 0.061 0.121 0.175 0.226 0.272 0.312



## Next steps