EAS508-HW4

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2022-10-20

Lab Code Homework

5.3 Cross Validation Labs

5.3.1 Validation Set Approach

```r
# Setting the seed and loading the data

library(ISLR2)
set.seed(1)
train <- sample(392,196)
```

```r
# Fitting a linear regression on the train data using subset option

lm.fit <- lm(mpg ~ horsepower, data = Auto, subset = train)
```

```r
# Predicting the estimates for the 392 observations and calculate the MSE for 192 observations

mean((Auto$mpg - predict(lm.fit, Auto))[-train]^2)
```

```
## [1] 23.26601
```

```r
# Fitting cubic regression and calculating the MSE

lm.fit2 <- lm(mpg ~poly(horsepower, 2), data = Auto, subset = train)

mean((Auto$mpg - predict(lm.fit2, Auto))[-train]^2)
```

```
## [1] 18.71646
```

```r
# Fitting uadratic regression and calculating the MSE

lm.fit3 <- lm(mpg ~ poly(horsepower, 3), data = Auto, subset = train)

mean((Auto$mpg - predict(lm.fit3, Auto))[-train]^2)
```

```
## [1] 18.79401
```

```r
# Using different seed and calculatiing the values for all the three regressions - will result into dif
set.seed(2)
train <- sample(392,196)

# Linear regression MSE

lm.fit <- lm(mpg ~ horsepower, data = Auto, subset = train)

mean((Auto$mpg - predict(lm.fit, Auto))[-train]^2)
```

```
## [1] 25.72651
```

```r
# Cubic regression MSE

lm.fit2 <- lm(mpg ~poly(horsepower, 2), data = Auto, subset = train)

mean((Auto$mpg - predict(lm.fit2, Auto))[-train]^2)
```

```
## [1] 20.43036
```

```r
# Quadratic regression MSE


lm.fit3 <- lm(mpg ~poly(horsepower, 3), data = Auto, subset = train)

mean((Auto$mpg - predict(lm.fit3, Auto))[-train]^2)
```

```
## [1] 20.38533
```

5.3.2 Leave One-Out Cross-Validation

```r
# LOOCV using glm() package

glm.fit <- glm(mpg ~ horsepower, data = Auto)

coef(glm.fit)
```

```
## (Intercept)   horsepower
##  39.9358610  -0.1578447
```

```r
# LOOCV using normal lm() function

lm.fit <- lm(mpg ~ horsepower, data = Auto)

coef(lm.fit)
```

```
## (Intercept)   horsepower
##  39.9358610  -0.1578447
```

```r
# Cross-validation error using glm() package

library(boot)

glm.fit <- glm(mpg ~ horsepower, data = Auto)

cv.err <- cv.glm(Auto, glm.fit)

cv.err$delta
```

```
## [1] 24.23151 24.23114
```

```r
# Calculating CV error for for polynomial of order 1 to 10 using a for loop.

cv.error <- rep(0,10)

for (i in  1:10) {

  glm.fit <- glm(mpg ~ poly(horsepower, i), data = Auto)
  cv.error[i] <- cv.glm(Auto, glm.fit)$delta[1]

}

cv.error
```

```
##  [1] 24.23151 19.24821 19.33498 19.42443 19.03321 18.97864 18.83305 18.96115
##  [9] 19.06863 19.49093
```

5.3.3 k-Fold Cross Validation

```r
# Calculating k-fold CV error for for polynomial of order 1 to 10 with k = 10

set.seed(17)
cv.error.10 <- rep(0,10)

for (i in  1:10) {

  glm.fit <- glm(mpg ~ poly(horsepower, i), data = Auto)
  cv.error.10[i] <- cv.glm(Auto, glm.fit, K = 10)$delta[1]

}

cv.error.10
```

```
##  [1] 24.27207 19.26909 19.34805 19.29496 19.03198 18.89781 19.12061 19.14666
##  [9] 18.87013 20.95520
```

6.5.3 PCR and PLS Regression

```r
# Creating model matrix for x and storing all salary values in y

# Omitting NA values

Hitters <- na.omit(Hitters)

x <- model.matrix(Salary ~ ., Hitters)[, -1]
y <- Hitters$Salary

# Creating train and test by setting the R seed

set.seed(1)
train <- sample(1:nrow(x), nrow(x) / 2)
test <- (-train)
y.test <- y[test]
```

```r
# Applying PCR to Hitters data to predcit Salary

library(pls)
```

Principal Components Regression

```
##
## Attaching package: 'pls'

## The following object is masked from 'package:stats':
##
##     loadings
```

```r
set.seed(2)
pcr.fit <- pcr(Salary ~., data = Hitters, scale = TRUE, validation = "CV")
```

```r
# Checking summary of our fit

summary(pcr.fit)
```

```
## Data:    X dimension: 263 19
##  Y dimension: 263 1
## Fit method: svdpc
## Number of components considered: 19
##
## VALIDATION: RMSEP
## Cross-validated using 10 random segments.
##        (Intercept)  1 comps  2 comps  3 comps  4 comps  5 comps  6 comps
## CV            452    351.9    353.2     355.0    352.8    348.4    343.6
## adjCV         452    351.6    352.7     354.4    352.1    347.6    342.7
##         7 comps  8 comps  9 comps  10 comps  11 comps  12 comps  13 comps
## CV        345.5    347.7    349.6     351.4     352.1     353.5     358.2
```

```
## adjCV       344.7       346.7       348.5       350.1       350.7       352.0       356.5
##          14 comps  15 comps  16 comps  17 comps  18 comps  19 comps
## CV            349.7       349.4       339.9       341.6       339.2       339.6
## adjCV         348.0       347.7       338.2       339.7       337.2       337.6
##
## TRAINING: % variance explained
##           1 comps  2 comps  3 comps  4 comps  5 comps  6 comps  7 comps  8 comps
## X           38.31     60.16     70.84     79.03     84.29     88.63     92.26     94.96
## Salary      40.63     41.58     42.17     43.22     44.90     46.48     46.69     46.75
##           9 comps  10 comps  11 comps  12 comps  13 comps  14 comps  15 comps
## X           96.28     97.26     97.98     98.65     99.15     99.47     99.75
## Salary      46.86     47.76     47.82     47.85     48.10     50.40     50.55
##           16 comps  17 comps  18 comps  19 comps
## X           99.89     99.97     99.99    100.00
## Salary      53.01     53.85     54.61     54.61
```

```
# Plotting cross-validation MSE
```

```
validationplot(pcr.fit, val.type = "MSEP")
```
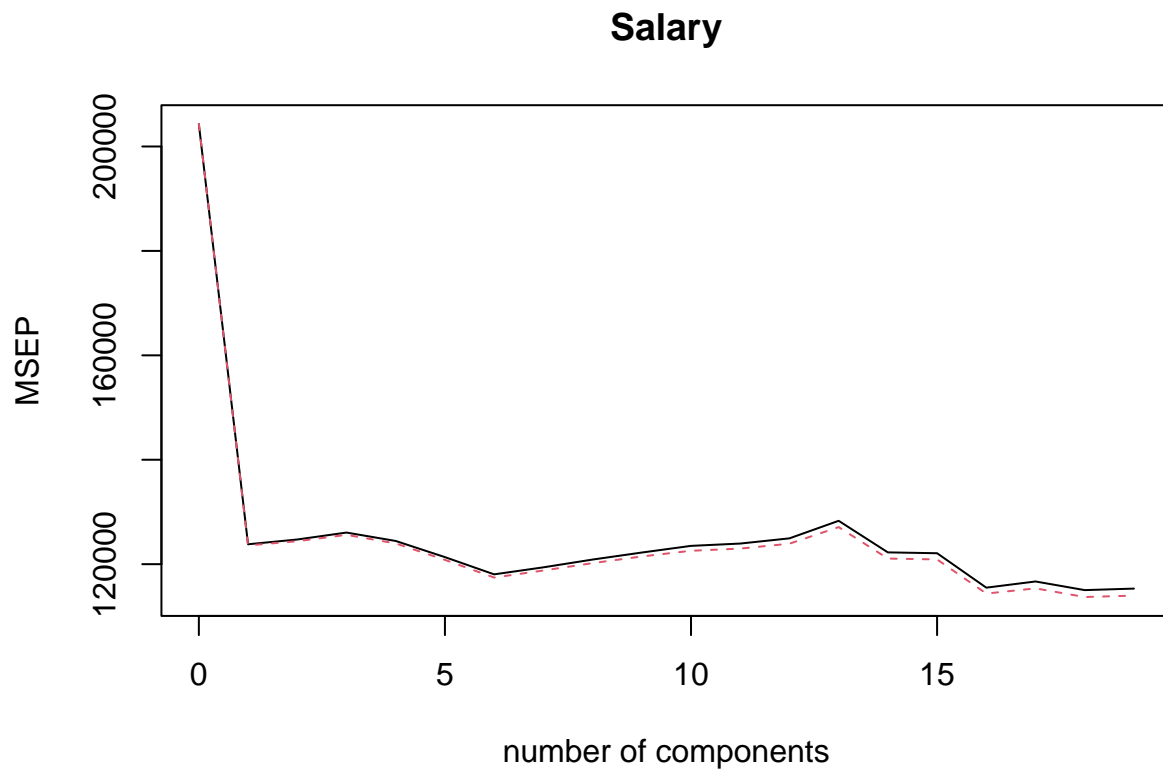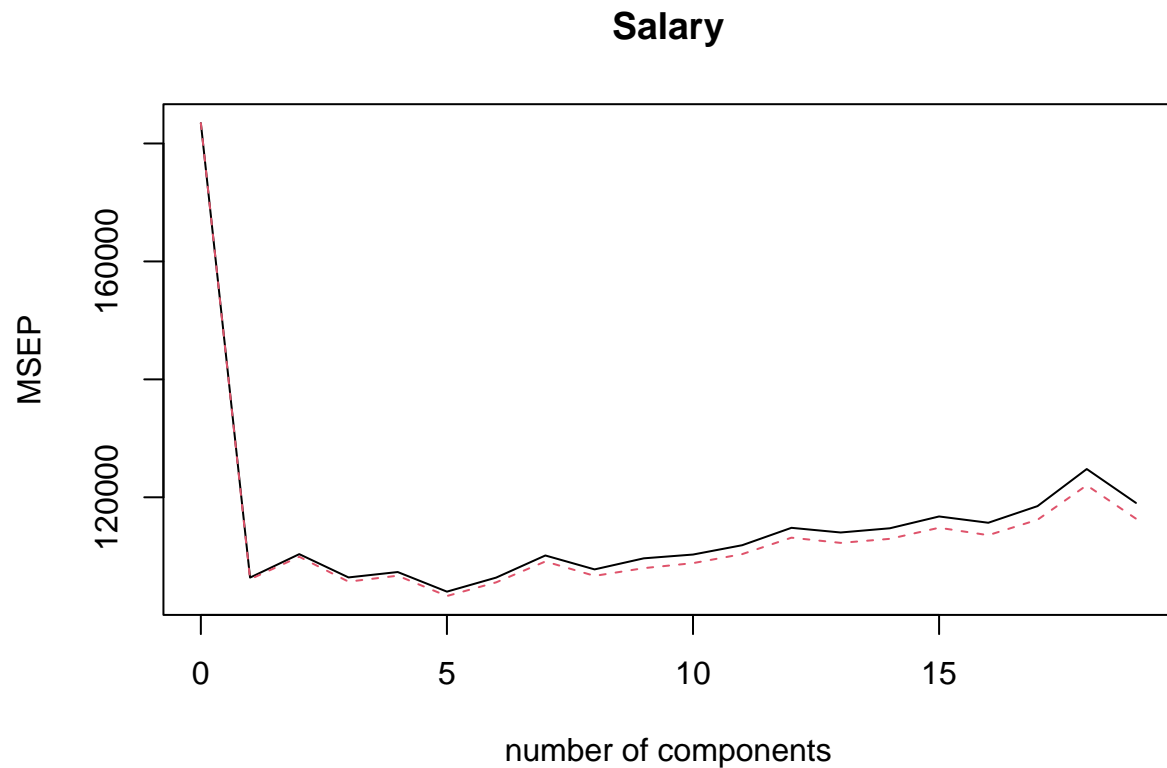

Salary

```
# Performing PCR on the training data using subset function and plotting the CV MSE
```

```
set.seed(1)
```

```
pcr.fit <- pcr(Salary ~., data = Hitters, subset = train, scale = TRUE, validation = "CV")
```

```
validationplot(pcr.fit, val.type = "MSEP")
```

Salary

number of components

```
# Find the lowest CV error when M = 5


pcr.pred <- predict(pcr.fit, x[test, ], ncomp = 5)

mean((pcr.pred - y.test)^2)
```

```
## [1] 142811.8
```

```
# Fit PCR on complete dataset using M = 5 identified by CV

pcr.fit <- pcr(y~x, scale = TRUE, ncomp = 5)

summary(pcr.fit)
```

```
## Data:    X dimension: 263 19
##  Y dimension: 263 1
## Fit method: svdpc
## Number of components considered: 5
## TRAINING: % variance explained
##     1 comps  2 comps  3 comps  4 comps  5 comps
## X    38.31    60.16    70.84    79.03    84.29
## y    40.63    41.58    42.17    43.22    44.90
```

```
# Implement PLS using plsr() function

set.seed(1)
pls.fit <- plsr(Salary ~ ., data = Hitters, subset = train, scale = TRUE, validation = "CV")

summary(pls.fit)
```

Partial Least Squares

```
## Data:     X dimension: 131 19
##  Y dimension: 131 1
## Fit method: kernelpls
## Number of components considered: 19
##
## VALIDATION: RMSEP
## Cross-validated using 10 random segments.
##         (Intercept)  1 comps  2 comps  3 comps  4 comps  5 comps  6 comps
## CV            428.3    325.5    329.9    328.8    339.0    338.9    340.1
## adjCV         428.3    325.0    328.2    327.2    336.6    336.1    336.6
##         7 comps  8 comps  9 comps  10 comps  11 comps  12 comps  13 comps
## CV        339.0    347.1    346.4     343.4     341.5     345.4     356.4
## adjCV     336.2    343.4    342.8     340.2     338.3     341.8     351.1
##         14 comps  15 comps  16 comps  17 comps  18 comps  19 comps
## CV         348.4     349.1     350.0     344.2     344.5     345.0
## adjCV      344.2     345.0     345.9     340.4     340.6     341.1
##
## TRAINING: % variance explained
##          1 comps  2 comps  3 comps  4 comps  5 comps  6 comps  7 comps  8 comps
## X          39.13    48.80    60.09    75.07    78.58    81.12    88.21    90.71
## Salary     46.36    50.72    52.23    53.03    54.07    54.77    55.05    55.66
##          9 comps  10 comps  11 comps  12 comps  13 comps  14 comps  15 comps
## X          93.17     96.05     97.08     97.61     97.97     98.70     99.12
## Salary     55.95     56.12     56.47     56.68     57.37     57.76     58.08
##          16 comps  17 comps  18 comps  19 comps
## X           99.61     99.70     99.95    100.00
## Salary      58.17     58.49     58.56     58.62
```

```
# Evaluating the coresponding test set MSE

pls.pred <- predict(pls.fit, x[test, ], ncomp = 1)

mean((pls.pred - y.test)^2)
```

```
## [1] 151995.3
```

```
# Fitting PLS on complete dataset when M = 1

pls.fit <- plsr(Salary ~ ., data = Hitters, scale = TRUE, ncomp = 1)

summary(pls.fit)
```

```
## Data:     X dimension: 263 19
##  Y dimension: 263 1
## Fit method: kernelpls
## Number of components considered: 1
## TRAINING: % variance explained
##          1 comps
## X          38.08
## Salary     43.05
```

7.8.3 GAMs

```r
# Fit a GAM or predict wage using natural spline functions of years and age.

gam1 <- lm(wage ~ splines::ns(year, 4) + splines::ns(age, 5) + education, data = Wage)
```

```r
# Fit the model using smoothing splines

library(gam)
```

```
## Loading required package: splines
```

```
## Loading required package: foreach
```

```
## Loaded gam 1.20.2
```
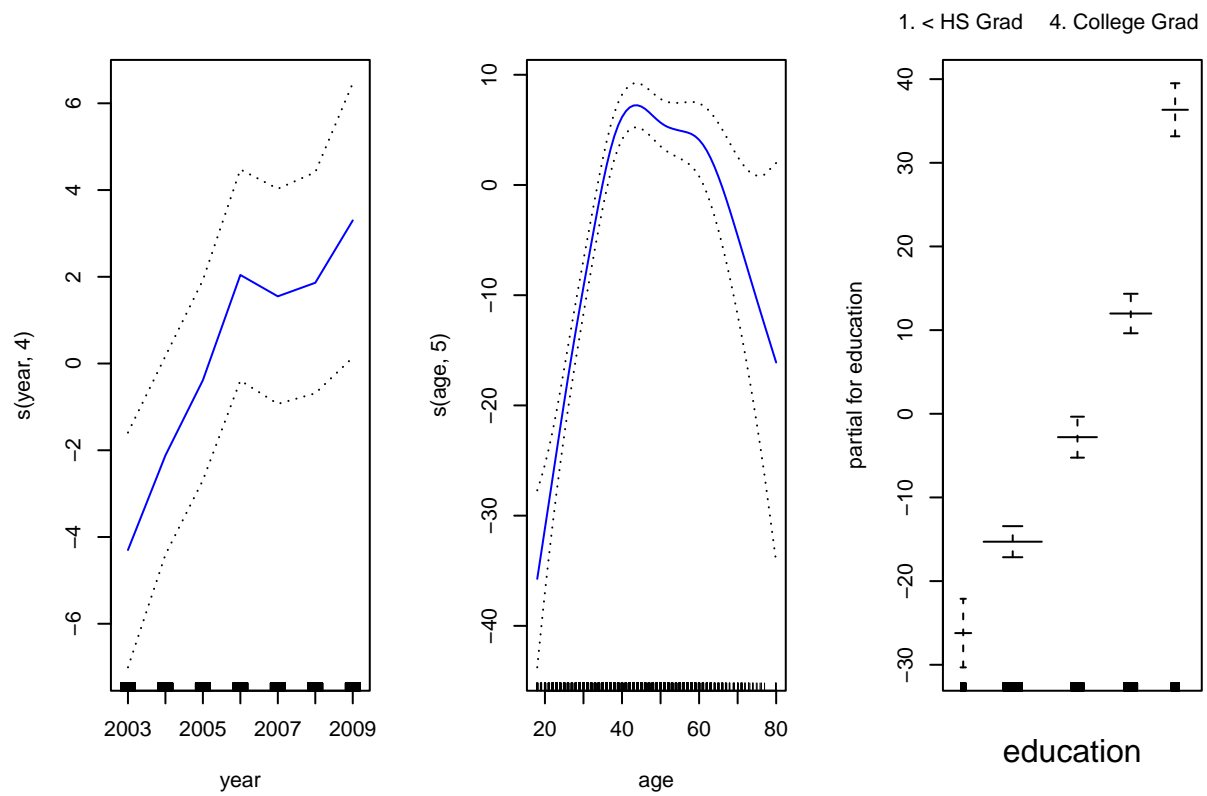
```r
gam.m3 <- gam(wage ~ s(year, 4) + s(age, 5) + education, data = Wage)
```
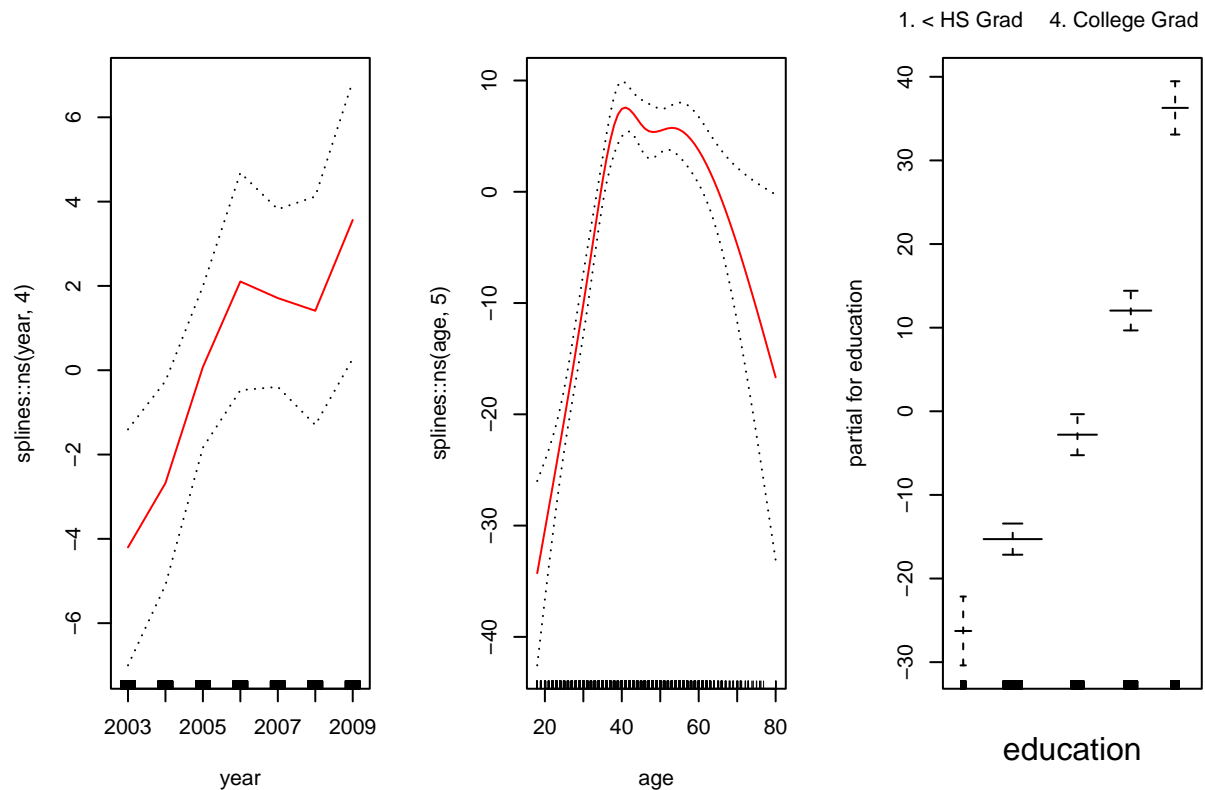
```r
# Plot the model

par(mfrow = c(1,3))
plot(gam.m3, se = TRUE, col = "blue")
```

```
# Plotting the GAM created using lm

par(mfrow = c(1,3))
plot.Gam(gam1, se = TRUE, col = "red")
```

```
# Performing ANOVA test to determine the best model

gam.m1 <- gam(wage ~ s(age, 5) + education,  data = Wage)
gam.m2 <- gam(wage ~ year + s(age, 5) + education, data = Wage)

anova(gam.m1, gam.m2, gam.m3, test = "F")
```

```
## Analysis of Deviance Table
##
## Model 1: wage ~ s(age, 5) + education
## Model 2: wage ~ year + s(age, 5) + education
## Model 3: wage ~ s(year, 4) + s(age, 5) + education
##   Resid. Df Resid. Dev Df Deviance       F     Pr(>F)
## 1      2990    3711731
## 2      2989    3693842  1  17889.2 14.4771 0.0001447 ***
## 3      2986    3689770  3   4071.1  1.0982 0.3485661
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
# summary of gam.m3

summary(gam.m3)
```

```
##
## Call: gam(formula = wage ~ s(year, 4) + s(age, 5) + education, data = Wage)
```

```
## Deviance Residuals:
##     Min      1Q  Median      3Q     Max
## -119.43  -19.70   -3.33   14.17  213.48
##
## (Dispersion Parameter for gaussian family taken to be 1235.69)
##
##     Null Deviance: 5222086 on 2999 degrees of freedom
## Residual Deviance: 3689770 on 2986 degrees of freedom
## AIC: 29887.75
##
## Number of Local Scoring Iterations: NA
##
## Anova for Parametric Effects
##             Df  Sum Sq Mean Sq F value    Pr(>F)
## s(year, 4)    1   27162   27162  21.981 2.877e-06 ***
## s(age, 5)     1  195338  195338 158.081 < 2.2e-16 ***
## education     4 1069726  267432 216.423 < 2.2e-16 ***
## Residuals  2986 3689770    1236
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Anova for Nonparametric Effects
##             Npar Df Npar F  Pr(F)
## (Intercept)
## s(year, 4)        3  1.086 0.3537
## s(age, 5)         4 32.380 <2e-16 ***
## education
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
# Using the predict method for class GAM

preds <- predict(gam.m2, newdata = Wage)
```
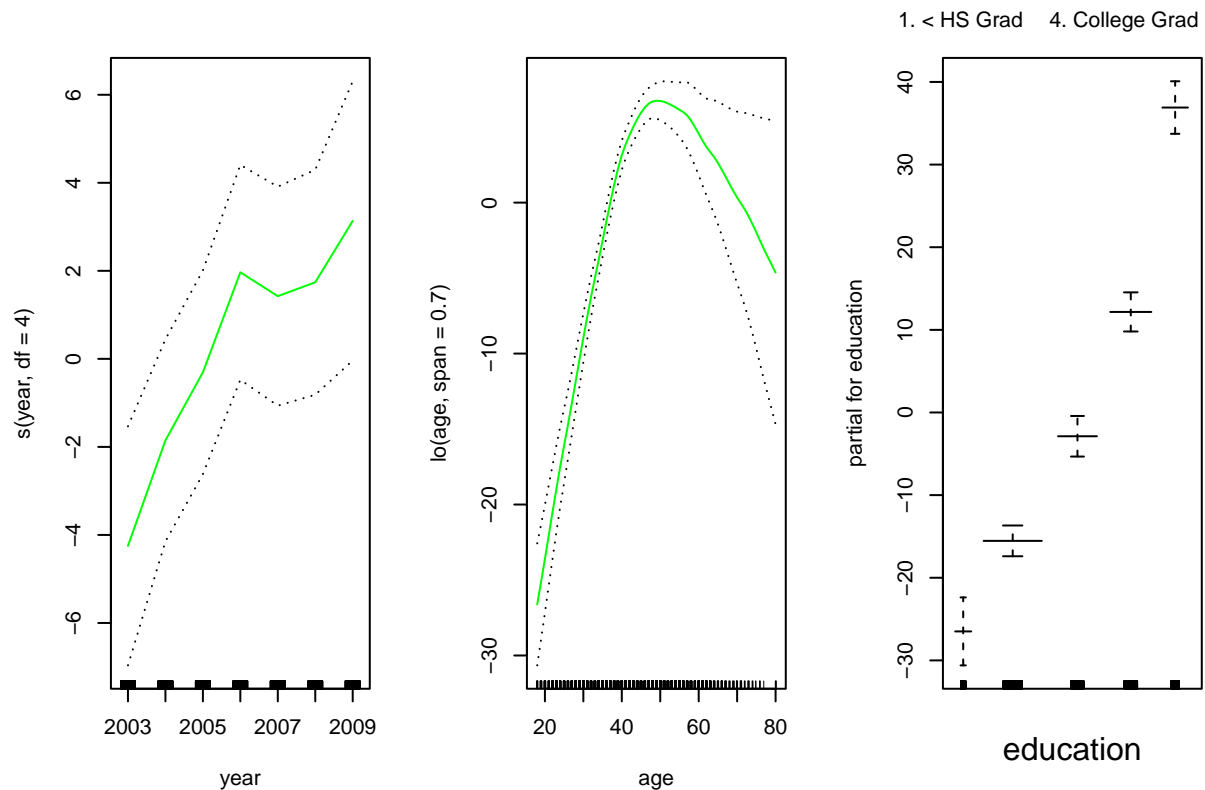
```r
# Using local regression fits in GAM using lo()

gam.lo <- gam(wage ~ s(year, df = 4) + lo(age, span = 0.7) + education, data = Wage)

par(mfrow = c(1,3))
plot.Gam(gam.lo, se = TRUE, col = "green")
```

```
# Using lo() to create interactions before calling gam

gam.lo.i <- gam(wage ~ lo(year, age, span = 0.5) + education, data = Wage)
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, : liv
## too small. (Discovered by lowesd)
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, : lv
## too small. (Discovered by lowesd)
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, : liv
## too small. (Discovered by lowesd)
```

```
## Warning in lo.wam(x, z, wz, fit$smooth, which, fit$smooth.frame, bf.maxit, : lv
## too small. (Discovered by lowesd)
```

```
# Plotting the 2D surface using akima package

library(akima)
par(mfrow = c(1,2))
plot(gam.lo.i)
```
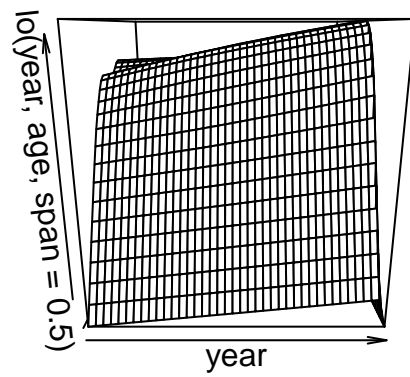
1. < HS Grad   4. College Grad
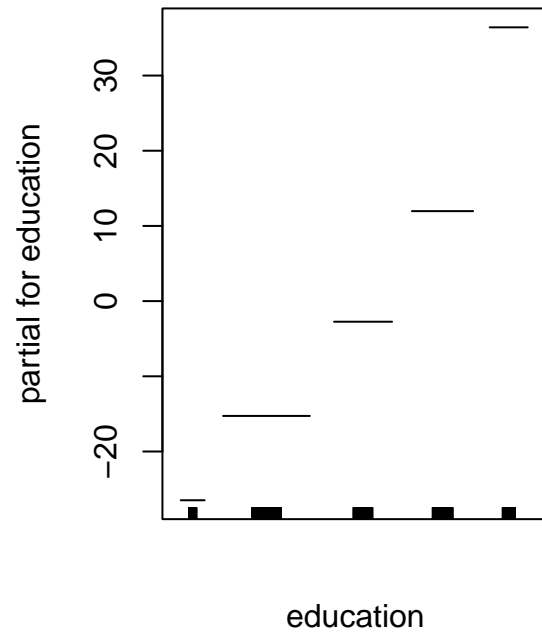
education

```r
# Fittinga logistic regression GAM using I() function

gam.lr <- gam(I(wage > 250) ~ year + s(age, df = 5) + education, family = binomial, data = Wage)

par(mfrow = c(1,3))
plot(gam.lr, se = TRUE, col = "green")
```
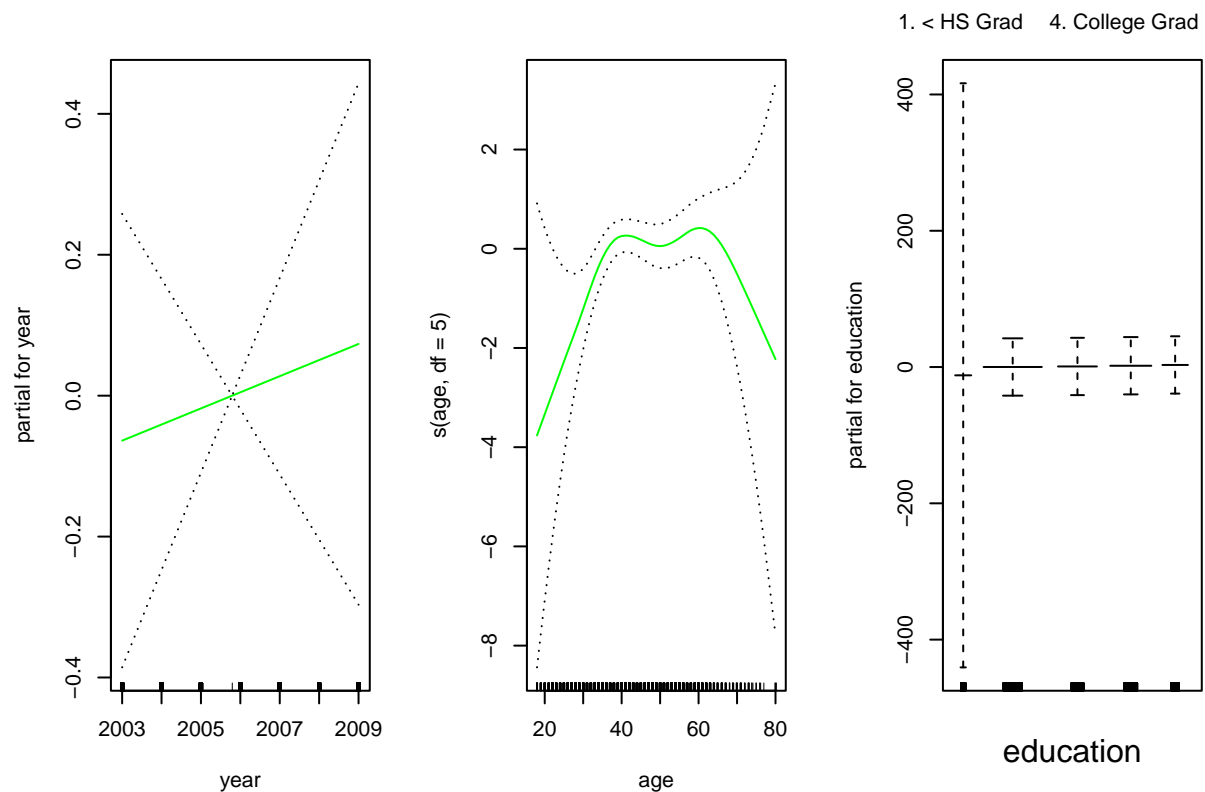
```
# Creeate a table with high earnes in the < HS category

attach(Wage)
table(education, I(wage > 250))
```

```
##
## education          FALSE TRUE
##   1. < HS Grad        268    0
##   2. HS Grad          966    5
##   3. Some College     643    7
##   4. College Grad     663   22
##   5. Advanced Degree  381   45
```

```
# Fitting a logsitic regression GAM by skipping the education category

gam.lr.s <- gam( I(wage > 250) ~ year + s(age, df = 5) + education, family = binomial, subset = (educat:

par(mfrow = c(1,3))
plot(gam.lr.s, se = TRUE, col = "green")
```

2. HS Grad   5. Advanced Degree
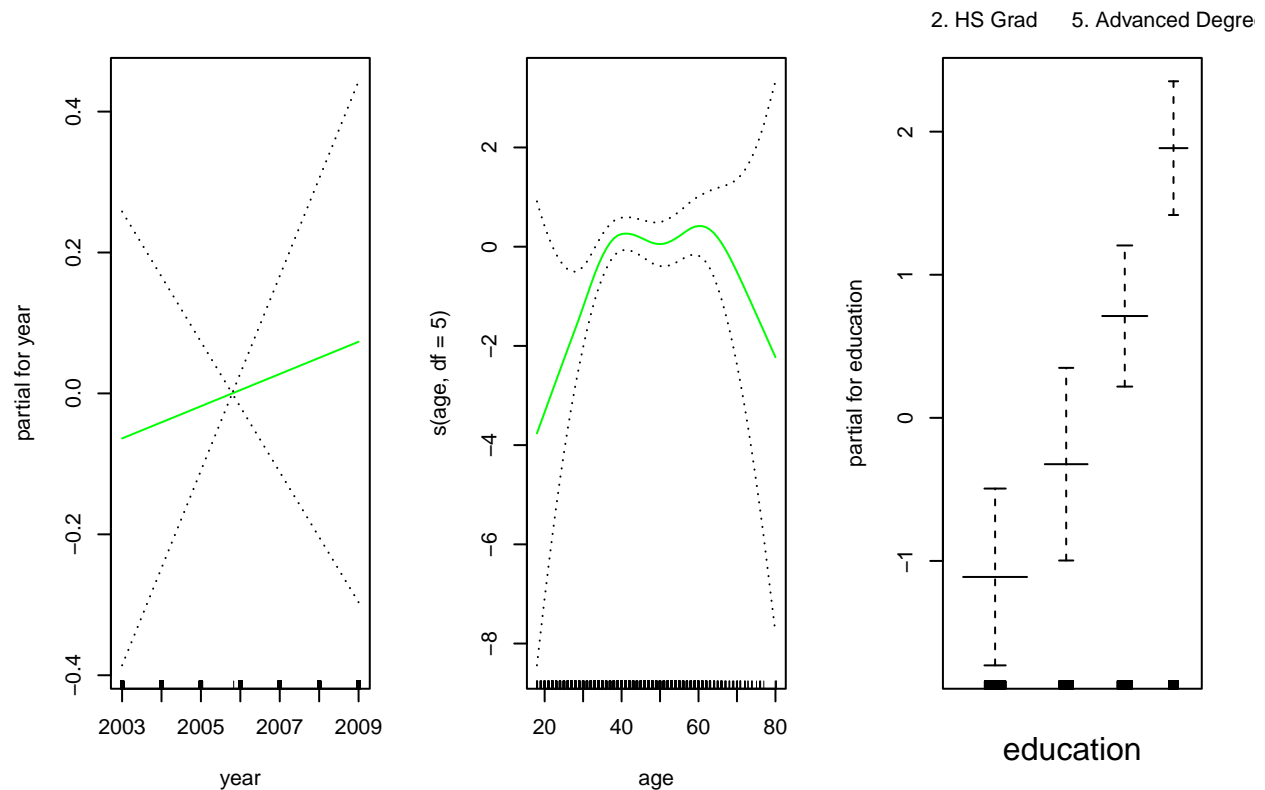
5.4 Q8 - Perform cross-validation on a simulated data set.

(a) Generate a simulated data set as follows:

```
# Generate a simulated data set

set.seed(1)

x <- rnorm(100)
y <- x - 2 * x^2 + rnorm(100)
```

As we have one predictor coefficient and 100 observations (as rnorm(100) is used) , our $\mathbf{n = 1}$ and $\mathbf{p = 100}$

Our equation will be $\mathbf{Y = x \text{ - } 2x\text{^}2 + e}$

(b) Create a scatterplot of X against Y. Comment on what you find.

```
# Scatterplot of X against Y.


myfun <- function(x) {
  x - 2 * x^2

}
```

```
# Using ggplot2 to plot a scatterplot

library(ggplot2)

ggplot(mapping  = aes(x = x,y = y)) +
  geom_point(colour = "blue") +
  geom_smooth(method = "lm", formula = "y ~ x + I(x^2)", se = FALSE, colour = "orange")
```



```
#
```
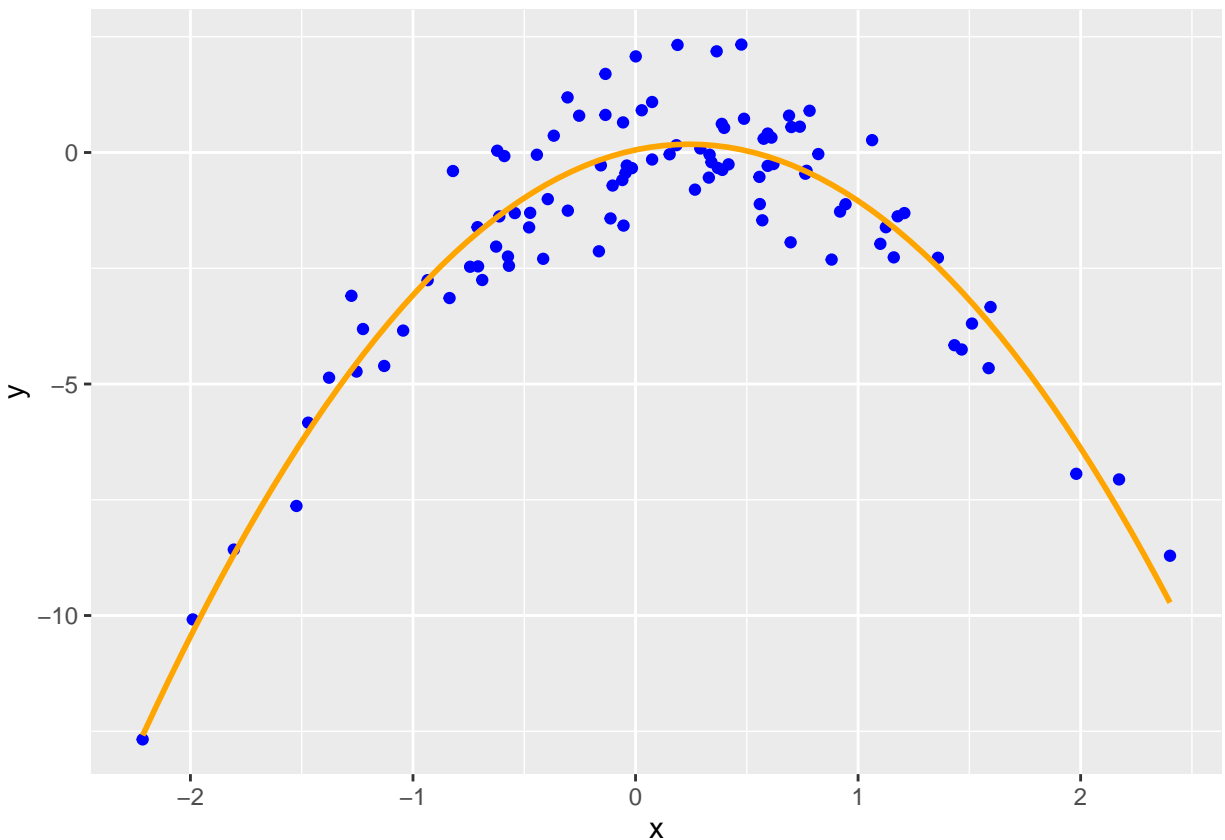
As we can see, our equation creates a concave down parabola and and we can notice a little bit of noise at the vertex of our parabola. The points with the support of our curve also suggests the existence of a curved relationship which hints to a quadratic relationship.

(c) Set a random seed, and then compute then LOOCV errors that result from fitting the following four models using least squares:

As we can see from all the models, they start from polynomial order 1 to order 4, so we can use a loop to compute all the LOOCV errors.

Let's create a data frame out of our x and y values.

```
# Creating a data frame using random seed

set.seed(25)

data <- data.frame(x = x, y = y)
```

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```
# Computing LOOCV errors from polynomial order 1 to 4.

loocv.error <- rep(0,4)

for (i in  1:4) {

  glm.fit <- glm(y ~ poly(x, i), data = data)
  loocv.error[i] <- cv.glm(data, glm.fit)$delta[1]

}

poly_order <- c("Order 1", "Order 2", "Order 3", "Order 4")


setNames(loocv.error, poly_order)
```

```
##   Order 1   Order 2   Order 3   Order 4
## 7.2881616 0.9374236 0.9566218 0.9539049
```

(d) Repeat (c) using another random seed, and report your results. Are your results the same as what you got in (c)? Why?

```
# Changing seed and repeating the steps

set.seed(50)

loocv.error <- rep(0,4)

for (i in  1:4) {

  glm.fit <- glm(y ~ poly(x, i), data = data)
  loocv.error[i] <- cv.glm(data, glm.fit)$delta[1]

}

poly_order <- c("Order 1", "Order 2", "Order 3", "Order 4")


setNames(loocv.error, poly_order)
```

```
##   Order 1   Order 2   Order 3   Order 4
## 7.2881616 0.9374236 0.9566218 0.9539049
```

We get exact same error values with a random seed and this is because in LOOCV there is no element of randomness i.e. we will always have the same LOOCV error values every time.

(e) Which of the models in (c) had the smallest LOOCV error? Is that what you expected? Explain your answer.

We see that the the lowest value of LOOCV error is at Order 2 which is **0.937** which is not much surprising to see as the scatter plot which we created in (b) already hinted to a quadratic relationship.

(f) Comment on the statistical significance of the coefficient estimates that results from fitting each of the models in (c) using least squares. Do these results agree with the conclusions drawn based on the cross-validation results ?

```
# Looking at coefficients significants for all the order models, can be seen in order 4 polynomial regr

glm.fit4 <- glm(y ~ poly(x, 4), data = data)

summary(glm.fit)
```

```
##
## Call:
## glm(formula = y ~ poly(x, i), data = data)
##
## Deviance Residuals:
##     Min       1Q    Median       3Q      Max
## -2.0550  -0.6212  -0.1567   0.5952   2.2267
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -1.55002    0.09591 -16.162  < 2e-16 ***
## poly(x, i)1   6.18883    0.95905   6.453 4.59e-09 ***
## poly(x, i)2 -23.94830    0.95905 -24.971  < 2e-16 ***
## poly(x, i)3   0.26411    0.95905   0.275    0.784
## poly(x, i)4   1.25710    0.95905   1.311    0.193
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.9197797)
##
##     Null deviance: 700.852  on 99  degrees of freedom
## Residual deviance:  87.379  on 95  degrees of freedom
## AIC: 282.3
##
## Number of Fisher Scoring iterations: 2
```

6.6 Q9 - Predict the number of applications received using the other variables in the `College` data set.

(a) Split the data set into a training set and a test set.

```
# Cleaning data and splitting the dataset into train and test data

# Loading the necessary packages

library(ISLR)
```

```
##
## Attaching package: 'ISLR'

## The following object is masked _by_ '.GlobalEnv':
##
##     Hitters

## The following objects are masked from 'package:ISLR2':
##
##     Auto, Credit
```

```r
library(glmnet)
```

```
## Loading required package: Matrix
```

```
## Loaded glmnet 4.1-4
```

```r
library(pls)

# Removing NA values

College <- na.omit(College)


set.seed(49)

train_index <- sample(1:dim(College)[1], dim(College)[1] / 2)
test_index <- (-train_index)

train <- College[train_index, ]
test <- College[test_index, ]

train
```

```
##                                          Private  Apps Accept Enroll
## North Central College                        Yes  1127    884    308
## Gordon College                               Yes   674    565    282
## Indiana University at Bloomington             No 16587  13243   5873
## Juniata College                              Yes  1005    859    298
## Niagara University                           Yes  2220   1796    467
## Point Park College                           Yes   875    744    207
## College of Saint Benedict                    Yes   938    864    511
## Capital University                           Yes  1747   1382    449
## University of Massachusetts at Dartmouth      No  3347   2597   1006
## Cedar Crest College                          Yes   776    607    198
## Canisius College                             Yes  2853   2193    753
## Elmira College                               Yes  1457   1045    345
## Longwood College                              No  2747   1870    724
## New York University                          Yes 13594   7244   2505
## University of Southern Mississippi            No  2850   2044   1046
## Augsburg College                             Yes   662    513    257
## Huron University                             Yes   600    197    124
## Southwestern College                         Yes   213    155     75
## College of Santa Fe                          Yes   546    447    189
## Simmons College                              Yes  1003    782    295
## Daniel Webster College                       Yes   585    508    153
## Southern California College                  Yes   385    340    193
## Marywood College                             Yes  1107    859    323
## Maryville College                            Yes  1464    888    176
## Stetson University                           Yes  1557   1227    489
## Webster University                           Yes   665    462    226
## North Dakota State University                 No  2968   2297   1610
## Wayne State College                           No  1373   1373    724
```

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## North Park College                               Yes   465   361   176
## King's College                                    Yes  1456  1053   381
## University of Wisconsin at Madison                  No 14901 10932  4631
## Dickinson State University                          No   434   412   319
## Washington State University                         No  6540  5839  2440
## Eastern Mennonite College                          Yes   486   440   227
## University of Tennessee at Knoxville                No  7473  5372  3013
## Mount Vernon Nazarene College                      Yes   510   485   334
## University of Kansas                                No  8579  5561  3681
## Rowan College of New Jersey                         No  3820  1431   695
## Lyndon State College                                No   535   502   223
## Hastings College                                   Yes   817   708   262
## Ohio University                                     No 11023  8298  3183
## George Washington University                       Yes  7875  5062  1492
## St. Martin's College                               Yes   191   165    63
## Western Washington University                       No  5548  3563  1549
## University of Wisconsin at Milwaukee                No  5244  3782  1930
## Capitol College                                    Yes   100    90    35
## Marymount College Tarrytown                        Yes   478   327   117
## Westminster College PA                             Yes  1738  1373   417
## University of Oklahoma                              No  4743  3970  2233
## Texas Wesleyan University                          Yes   592   501   279
## University of Puget Sound                          Yes  4044  2826   688
## Washington College                                 Yes  1209   942   214
## Point Loma Nazarene College                        Yes   809   687   428
## California Lutheran University                     Yes   563   247   247
## Northwest Missouri State University                 No  2729  2535  1257
## Berry College                                      Yes  1858  1221   480
## Hope College                                       Yes  1712  1483   624
## Bemidji State University                            No  1208   877   546
## South Dakota State University                       No  2807  2589  1701
## Southwestern University                            Yes  1244   912   352
## Fairfield University                               Yes  4784  3346   781
## University of Cincinnati                            No  6855  5553  2408
## Saint Cloud State University                        No  3971  3306  1921
## University of Charleston                           Yes   682   535   204
## Boston University                                  Yes 20192 13007  3810
## Lenoir-Rhyne College                               Yes   979   743   259
## Colorado State University                           No  9478  6312  2194
## Creighton University                               Yes  2967  2836   876
## George Fox College                                 Yes   809   726   294
## Bethune Cookman College                            Yes  1646  1150   542
## University of Maryland at Baltimore County          No  4269  2594   985
## Georgia State University                            No  3793  2341  1238
## Rivier College                                     Yes   484   386   141
## Colorado College                                   Yes  3207  1577   490
## University of Utah                                  No  5095  4491  2400
## University of Nebraska at Lincoln                   No  6277  6003  3526
## Georgian Court College                             Yes   348   281   127
## University of South Carolina at Columbia            No  7693  5815  2328
## Marist College                                     Yes  4731  3171   830
## James Madison University                            No 11223  5285  2082
## Brenau University                                  Yes   367   274   158
## Pacific Union College                              Yes   940   668   385
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## Defiance College                                  Yes    571    461    174
## Husson College                                    Yes    723    652    361
## Mount Saint Mary College                          Yes   1170    695    238
## Transylvania University                           Yes    759    729    244
## Eureka College                                    Yes    560    454    113
## Siena College                                     Yes   2961   1932    628
## Pace University                                   Yes   8256   3750   1522
## College of Saint Rose                             Yes    983    664    249
## Gettysburg College                                Yes   3596   2466    575
## Mary Washington College                            No   4350   2178    756
## Converse College                                  Yes    440    407    149
## Belmont Abbey College                             Yes    632    494    129
## University of Minnesota at Duluth                  No   4192   3126   1656
## Concordia University CA                           Yes    688    497    144
## Washington University                             Yes   7654   5259   1254
## Northeast Missouri State University                No   6040   4577   1620
## Scripps College                                   Yes    855    632    139
## University of North Carolina at Greensboro         No   5191   4134   1500
## University of Michigan at Ann Arbor                No  19152  12940   4893
## Albertson College                                 Yes    587    479    158
## Arizona State University Main campus               No  12809  10308   3761
## Hartwick College                                  Yes   2083   1725    430
## Virginia State University                          No   2996   2440    704
## University of Illinois - Urbana                    No  14939  11652   5705
## DePauw University                                 Yes   1994   1656    495
## Linfield College                                  Yes   1561   1188    458
## College Misericordia                              Yes   1432    888    317
## East Carolina University                           No   9274   6362   2435
## Adelphi University                                Yes   2186   1924    512
## Florida International University                   No   3306   2079   1071
## Central Wesleyan College                          Yes    174    146     88
## Worcester State College                            No   2197   1515    543
## St. Bonaventure University                        Yes   1489   1313    375
## Rutgers State University at Camden                 No   3366   1752    232
## Trinity College CT                                Yes   3058   1798    478
## Morris College                                    Yes    882    730    330
## Quincy University                                 Yes   1025    707    297
## Morningside College                               Yes    586    533    239
## Livingstone College                               Yes    900    473    217
## Carleton College                                  Yes   2694   1579    489
## Sweet Briar College                               Yes    462    402    146
## Coe College                                       Yes   1006    742    275
## Clemson University                                 No   8065   5257   2301
## University of Dubuque                             Yes    576    558    137
## Amherst College                                   Yes   4302    992    418
## Brown University                                  Yes  12586   3239   1462
## Ferrum College                                    Yes   1339   1107    336
## Cazenovia College                                 Yes   3847   3433    527
## College of St. Scholastica                        Yes    672    596    278
## Tusculum College                                  Yes    626    372    145
## Eastern Connecticut State University               No   2172   1493    564
## Our Lady of the Lake University                   Yes   2308   1336    295
## Harvard University                                Yes  13865   2165   1606
## Dillard University                                Yes   1998   1376    651
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## University of Arkansas at Fayetteville          No  3235  3108  2133
## Westminster College                             Yes  996   866   377
## University of Hartford                           Yes 5081  4040  1194
## Villanova University                             Yes 7759  5588  1477
## Buena Vista College                              Yes  860   688   285
## Indiana State University                          No 5659  4761  3147
## Southeast Missouri State University               No 2281  1870  1408
## Norwich University                               Yes 1743  1625   626
## St. Norbert College                              Yes 1334  1243   568
## Franklin College                                 Yes  804   632   281
## Lehigh University                                Yes 6397  4304  1092
## Drew University                                  Yes 2153  1580   321
## University of Montevallo                          No 1351   892   570
## Hamilton College                                 Yes 3140  1783   454
## Oklahoma Christian University                    Yes  776   765   351
## Smith College                                    Yes 2925  1598   632
## Bowling Green State University                    No 9251  7333  3076
## Spring Arbor College                             Yes  372   362   181
## Saint Joseph College                             Yes  292   241    96
## Mount St. Mary's College                         Yes  657   537   113
## Pacific Lutheran University                      Yes 1603  1392   504
## Trinity College DC                               Yes  247   189   100
## Westmont College                                  No  950   713   351
## Vassar College                                   Yes 3550  1877   653
## Keene State College                               No 3121  2446   822
## Rocky Mountain College                           Yes  560   392   270
## University of Vermont                             No 7663  6008  1735
## McMurry University                               Yes  578   411   187
## Illinois Benedictine College                     Yes  607   558   269
## University of the South                          Yes 1445   966   326
## University of Wisconsin-Stout                     No 2593  1966  1030
## Wartburg College                                 Yes 1231  1074   345
## Clarke College                                   Yes  460   340   167
## University of San Francisco                      Yes 2306  1721   538
## Salem-Teikyo University                          Yes  489   384   120
## Kansas Wesleyan University                       Yes  589   575   148
## Augustana College IL                             Yes 1879  1658   497
## University of Maine at Presque Isle               No  461   381   235
## Stonehill College                                Yes 3646  2300   585
## Manchester College                               Yes 1004   802   239
## Millikin University                              Yes 1444  1261   456
## Western New England College                      Yes 1650  1471   409
## Beaver College                                   Yes 1163   850   348
## Stephens College                                 Yes  450   405   194
## Allentown Coll. of St. Francis de Sales          Yes 1179   780   290
## Rutgers State University at Newark                No 5785  2690   499
## Christopher Newport University                    No  883   766   428
## Eckerd College                                   Yes 1422  1109   366
## Milligan College                                 Yes  610   461   189
## Saint Olaf College                               Yes 2248  1673   745
## Lock Haven University of Pennsylvania             No 3570  2215   651
## Lakeland College                                 Yes  497   452   231
## Greensboro College                               Yes  608   494   176
## Central Connecticut State University              No 4158  2532   902
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## Hobart and William Smith Colleges            Yes   2688   2081    500
## Wesley College                               Yes    980    807    350
## Central Missouri State University             No    4681   4101   1436
## Rockhurst College                            Yes    935    858    345
## Spelman College                              Yes   3713   1237    443
## Bentley College                              Yes   3466   2330    640
## Bluefield College                            Yes    377    358    181
## Western Michigan University                   No    9167   7191   2738
## Jersey City State College                     No    2957   1423    691
## Bethel College KS                            Yes    202    184    122
## Xavier University                            Yes   1959   1805    695
## Drake University                             Yes   2799   2573    839
## College of Notre Dame of Maryland            Yes    457    356    177
## Belmont University                           Yes   1220    974    481
## Alma College                                 Yes   1267   1080    385
## Jamestown College                            Yes    472    410    262
## Wabash College                               Yes    800    623    256
## Virginia Union University                    Yes   1847   1610    453
## Westminster College MO                       Yes    662    553    184
## Oakland University                            No    3041   2581   1173
## Auburn University-Main Campus                 No    7548   6791   3070
## Illinois State University                     No    8681   6695   2408
## Wentworth Institute of Technology            Yes   1480   1257    452
## Goshen College                               Yes    440    396    221
## Johnson State College                         No    833    669    279
## York College of Pennsylvania                 Yes   2989   1855    691
## Southwest Missouri State University           No    6118   5254   3204
## Butler University                            Yes   2362   2037    700
## Lawrence University                          Yes   1243    947    324
## University of Richmond                       Yes   5892   2718    756
## Hood College                                 Yes    699    565    176
## Brigham Young University at Provo            Yes   7365   5402   4615
## Rosary College                               Yes    434    321    141
## Campbell University                          Yes   2087   1339    657
## Wingate College                              Yes   1239   1017    383
## Rhodes College                               Yes   2302   1831    391
## St. John Fisher College                      Yes   1368   1064    354
## University of Scranton                       Yes   4471   2942    910
## Franklin Pierce College                      Yes   5187   4471    446
## Marshall University                          Yes   4226   3666   2007
## Mankato State University                      No    3073   2672   1547
## University of Oregon                          No    8631   6732   2546
## College of Notre Dame                        Yes    344    264     97
## Kentucky Wesleyan College                    Yes    584    497    175
## Lycoming College                             Yes   1286   1005    363
## Cumberland College                           Yes    995    789    398
## Manhattanville College                       Yes    962    750    212
## Seton Hall University                        Yes   4576   3565   1000
## Lynchburg College                            Yes   1756   1500    366
## Union College NY                             Yes   3495   1712    528
## University of Illinois at Chicago             No    8384   5727   2710
## Christian Brothers University                Yes    880    520    224
## University of Miami                          Yes   7122   5386   1643
## Saint Mary's College of Minnesota            Yes    876    802    367
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## Marymount University                              Yes   941   772   214
## Wesleyan University                               Yes  4772  1973   712
## University of Sci. and Arts of Oklahoma            No   285   280   208
## Immaculata College                                Yes   268   253   103
## Fordham University                                Yes  4200  2874   942
## Mount Union College                               Yes  1310  1086   458
## Geneva College                                    Yes   668   534   237
## Williams College                                  Yes  4186  1245   526
## Averett College                                   Yes   627   556   172
## Northwest Nazarene College                        Yes   616   514   385
## Virginia Wesleyan College                         Yes  1470   900   287
## University of Connecticut at Storrs               No  9735  7187  2064
## University of Virginia                            No 15849  5384  2678
## Freed-Hardeman University                         Yes   895   548   314
## Baker University                                  Yes   602   483   206
## Lewis University                                  Yes  1154  1050   395
## Moorhead State University                         No  2442  2164  1189
## Saint Francis College                             Yes  1046   824   284
## University of Maine at Machias                    No   441   369   172
## Bennington College                                Yes   519   327   114
## Guilford College                                  Yes  1202  1054   326
## Bethel College                                    Yes   502   384   104
## Westfield State College                           No  3100  2150   825
## Southern Illinois University at Edwardsville      No  2540  2195   994
## Dowling College                                   Yes  1011   829   410
## Marian College of Fond du Lac                     Yes   824   670   337
## Sioux Falls College                               Yes   437   400   211
## Monmouth College IL                               Yes   601   503   204
## Saint Mary-of-the-Woods College                  Yes   150   130    88
## Upper Iowa University                             Yes   663   452   192
## Voorhees College                                  Yes  1465  1006   188
## Pacific University                                Yes   943   849   288
## Willamette University                             Yes  1658  1327   395
## Siena Heights College                             Yes   464   419   183
## St. Thomas Aquinas College                        Yes   861   609   215
## Washington and Lee University                     Yes  3315  1096   425
## Alverno College                                   Yes   494   313   157
## Claflin College                                   Yes  1196   697   499
## University of Maine at Farmington                 No  1208   803   438
## Ramapo College of New Jersey                      No  2088   957   362
## Central College                                   Yes  1283  1113   401
## Ursuline College                                  Yes   325   260    86
## Hardin-Simmons University                         Yes   467   424   350
## Fontbonne College                                 Yes   291   245   126
## University of California at Irvine                No 15698 10775  2478
## Keuka College                                     Yes   461   381   174
## Beloit College                                    Yes  1320   923   284
## Baylor University                                 Yes  6075  5349  2367
## University of Detroit Mercy                       Yes   927   731   415
## Samford University                                Yes  1680  1395   691
## Southwestern Adventist College                    Yes   321   318   172
## Saint Xavier University                           Yes   785   647   295
## Harvey Mudd College                               Yes  1377   572   178
## Virginia Commonwealth University                  No  4963  3497  1567
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## Arkansas Tech University                     No  1734  1729   951
## New Mexico Institute of Mining and Tech.      No   787   601   233
## Pennsylvania State Univ. Main Campus          No 19315 10344  3450
## Meredith College                             Yes   857   772   376
## SUNY College  at Oswego                       No  8000  4556  1464
## University of New England                    Yes  1209   750   265
## Wells College                                Yes   318   240   130
## Allegheny College                            Yes  2652  1900   484
## McPherson College                            Yes   420   293    93
## Trinity College VT                           Yes   222   185    91
## Bridgewater College                          Yes   838   673   292
## Saint Vincent College                        Yes   700   595   278
## Blackburn College                            Yes   500   336   156
## University of Mississippi                     No  3844  3383  1669
## Sacred Heart University                      Yes  2307  1896   509
## Johns Hopkins University                     Yes  8474  3446   911
## Clinch Valley Coll. of  the Univ. of Virginia No   689   561   250
## College of Saint Catherine                   Yes   511   411   186
## Culver-Stockton College                      Yes  1576  1110   274
## Carroll College                              Yes  1160   991   352
## Cedarville College                           Yes  1307  1090   616
## Concordia College at St. Paul                Yes   281   266   139
## Philadelphia Coll. of Textiles and Sci.      Yes  1538  1259   468
## Manhattan College                            Yes  2432  1730   563
## Hiram College                                Yes   922   729   244
## Mississippi University for Women              No   480   405   380
## Yale University                              Yes 10705  2453  1317
## Valparaiso University                        Yes  2075  1727   520
## Barat College                                Yes   261   192   111
## Hollins College                              Yes   602   498   215
## Tulane University                            Yes  7033  5125  1223
## Waynesburg College                           Yes  1190   978   324
## Cornell College                              Yes  1538  1329   383
## Centenary College                            Yes   369   312    90
## Texas Lutheran College                       Yes   497   423   215
## West Virginia Wesleyan College               Yes  1566  1400   483
## Nazareth College of Rochester                Yes   947   798   266
## University of Pittsburgh-Main Campus          No  8586  6383  2503
## Saint Francis College IN                     Yes   213   166    85
## East Tennessee State University               No  3330  2730  1303
## Baldwin-Wallace College                      Yes  1690  1366   662
## University of West Florida                    No  1558  1254   472
## Colgate University                           Yes  4856  2492   727
## Wake Forest University                       Yes  5661  2392   903
## Loyola Marymount University                  Yes  3768  2662   753
## SUNY College at Buffalo                       No  5318  3515  1025
## Montclair State University                    No  5220  2128   865
## University of Delaware                       Yes 14446 10516  3252
## Marquette University                         Yes  5152  4600  1685
## William Woods University                     Yes   469   435   227
## University of South Carolina at Aiken         No   848   560   377
## Fresno Pacific College                       Yes   346   274   146
## Saint Joseph's University                    Yes  2519  2003   776
## West Chester University of Penn.              No  6502  3539  1372
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## Emory University                              Yes  8506  4168  1236
## Texas Southern University                      No   4345  3245  2604
## Saint Joseph's College                         Yes   833   682   217
## Loyola University Chicago                      Yes  3579  2959   868
## Whitman College                               Yes  1861   998   359
## Southwest State University                     No   1047   938   511
## Roger Williams University                      Yes  3304  2804   679
## Ohio Wesleyan University                       Yes  2190  1700   458
## Houghton College                              Yes   949   786   302
## Green Mountain College                         Yes   780   628   198
## Wellesley College                             Yes  2895  1249   579
## Saint Ambrose University                       Yes   897   718   276
## Huntington College                            Yes   450   430   125
## Barry University                              Yes   990   784   279
## Wheeling Jesuit College                        Yes   903   755   213
## Eastern College                               Yes   458   369   165
## Whitworth College                             Yes  1121   926   372
## Fayetteville State University                  No   1455  1064   452
## Western State College of Colorado              No   2702  1623   604
## Skidmore College                              Yes  4293  2728   591
## California State University at Fresno          No   4540  3294  1483
## Rensselaer Polytechnic Institute              Yes  4996  4165   936
## Saint Anselm College                          Yes  2095  1553   514
## Adrian College                                Yes  1428  1097   336
## University of North Carolina at Charlotte      No   5803  4441  1730
## Wheaton College IL                            Yes  1432   920   548
## Louisiana Tech University                      No   2397  2144  1525
## Bellarmine College                            Yes   807   707   308
## Loyola College                                Yes  4076  3137   738
## Polytechnic University                        Yes  1132   847   302
## University of Southern California             Yes 12229  8498  2477
## University of Mobile                          Yes   452   331   269
## John Brown University                         Yes   605   405   284
## SUNY College at Geneseo                        No   8598  4562  1143
## Mount Marty College                           Yes   279   276   126
## Grace College and Seminary                    Yes   548   428   167
##                                              Top10perc Top25perc F.Undergrad
## North Central College                              30        64         1310
## Gordon College                                     25        54         1151
## Indiana University at Bloomington                  25        72        24763
## Juniata College                                    36        55         1075
## Niagara University                                 65        99         1919
## Point Park College                                  7        38         1173
## College of Saint Benedict                          29        62         1715
## Capital University                                 34        66         1662
## University of Massachusetts at Dartmouth           10        37         4664
## Cedar Crest College                                25        58          791
## Canisius College                                   16        34         2978
## Elmira College                                     27        50         1109
## Longwood College                                   12        47         2874
## New York University                                70        86        12408
## University of Southern Mississippi                 20        50         9260
## Augsburg College                                   12        30         2074
## Huron University                                    3         9          392
```

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## Southwestern College                            28    66     504
## College of Santa Fe                              16    42     873
## Simmons College                                  23    53    1144
## Daniel Webster College                           12    30     460
## Southern California College                      18    38     784
## Marywood College                                 13    51    1452
## Maryville College                                26    52     624
## Stetson University                               37    69    1964
## Webster University                               17    44    1739
## North Dakota State University                    13    47    7368
## Wayne State College                               6    21    2754
## North Park College                               19    39     879
## King's College                                   20    45     500
## University of Wisconsin at Madison               36    80   23945
## Dickinson State University                       10    30    1376
## Washington State University                      31    70   14445
## Eastern Mennonite College                        19    48     903
## University of Tennessee at Knoxville             27    53   15749
## Mount Vernon Nazarene College                    18    36    1114
## University of Kansas                             25    50   17880
## Rowan College of New Jersey                      21    70    5303
## Lyndon State College                              6    20     959
## Hastings College                                 22    52     935
## Ohio University                                  21    54   14861
## George Washington University                     38    71    5471
## St. Martin's College                              5    25     494
## Western Washington University                    30    71    8909
## University of Wisconsin at Milwaukee             12    37   11561
## Capitol College                                  10    52     282
## Marymount College Tarrytown                       9    34     731
## Westminster College PA                           21    55    1335
## University of Oklahoma                           32    63   13436
## Texas Wesleyan University                        19    44    1204
## University of Puget Sound                        51    83    2738
## Washington College                               31    60     822
## Point Loma Nazarene College                      20    43    1889
## California Lutheran University                   23    52    1427
## Northwest Missouri State University               8    29    4787
## Berry College                                    37    68    1620
## Hope College                                     37    69    2505
## Bemidji State University                         12    36    3796
## South Dakota State University                    13    37    7000
## Southwestern University                          44    77    1177
## Fairfield University                             30    66    2984
## University of Cincinnati                         26    57   11036
## Saint Cloud State University                     10    34   11493
## University of Charleston                         22    43     771
## Boston University                                45    80   14971
## Lenoir-Rhyne College                             25    46    1188
## Colorado State University                        29    65   15646
## Creighton University                             30    60    3450
## George Fox College                               27    52    1271
## Bethune Cookman College                          12    30    2128
## University of Maryland at Baltimore County       27    57    6476
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## Georgia State University                            9      24     7732
## Rivier College                                       6      28      590
## Colorado College                                    56      87     1892
## University of Utah                                   27      53    13894
## University of Nebraska at Lincoln                    33      63    16454
## Georgian Court College                               12      52     1095
## University of South Carolina at Columbia             30      66    12594
## Marist College                                       12      31     3557
## James Madison University                             32      72     9652
## Brenau University                                    12      41      917
## Pacific Union College                                20      48     1316
## Defiance College                                     10      26      645
## Husson College                                       10      30      951
## Mount Saint Mary College                             14      48     1170
## Transylvania University                              57      81      867
## Eureka College                                       36      56      484
## Siena College                                        24      68     2669
## Pace University                                      37      70     5809
## College of Saint Rose                                23      57     1698
## Gettysburg College                                   42      78     1944
## Mary Washington College                              39      78     2997
## Converse College                                     35      70      643
## Belmont Abbey College                                17      36      709
## University of Minnesota at Duluth                    15      45     5887
## Concordia University CA                              30      75      641
## Washington University                                62      93     4879
## Northeast Missouri State University                  36      72     5640
## Scripps College                                      60      83      569
## University of North Carolina at Greensboro           15      44     7532
## University of Michigan at Ann Arbor                  66      92    22045
## Albertson College                                    38      62      678
## Arizona State University Main campus                 24      49    22593
## Hartwick College                                     22      49     1464
## Virginia State University                             2      30     3006
## University of Illinois - Urbana                      52      88    25422
## DePauw University                                    50      80     1983
## Linfield College                                     48      72     1548
## College Misericordia                                 29      58     1121
## East Carolina University                             14      44    13171
## Adelphi University                                   16      29     2683
## Florida International University                     42      89    10208
## Central Wesleyan College                              8      29     1047
## Worcester State College                               4      26     3089
## St. Bonaventure University                           13      45     1688
## Rutgers State University at Camden                   27      79     2585
## Trinity College CT                                   46      84     1737
## Morris College                                        2      13      926
## Quincy University                                    22      66     1070
## Morningside College                                  16      36      950
## Livingstone College                                  22      47      621
## Carleton College                                     75      93     1870
## Sweet Briar College                                  36      68      527
## Coe College                                          29      60     1127
## Clemson University                                   37      65    11755
```

28

```
## University of Dubuque                             11     39      662
## Amherst College                                   83     96     1593
## Brown University                                   87     95     5643
## Ferrum College                                     12     36     1051
## Cazenovia College                                   9     35     1010
## College of St. Scholastica                         29     60     1350
## Tusculum College                                   12     34      983
## Eastern Connecticut State University               14     50     2766
## Our Lady of the Lake University                    22     46     1202
## Harvard University                                 90    100     6862
## Dillard University                                 41     88     1539
## University of Arkansas at Fayetteville             25     65     9978
## Westminster College                                29     58     1411
## University of Hartford                              11     26     3768
## Villanova University                               30     68     6362
## Buena Vista College                                32     70     1928
## Indiana State University                           10     31     8596
## Southeast Missouri State University                18     43     6553
## Norwich University                                  8     29     1862
## St. Norbert College                                30     56     1946
## Franklin College                                   29     72      840
## Lehigh University                                  40     84     4298
## Drew University                                    56     84     1192
## University of Montevallo                           18     78     2385
## Hamilton College                                   40     82     1646
## Oklahoma Christian University                      22     44     1419
## Smith College                                      51     88     2479
## Bowling Green State University                     14     45    13699
## Spring Arbor College                               15     32     1501
## Saint Joseph College                               20     52      543
## Mount St. Mary's College                           37     90     1039
## Pacific Lutheran University                        31     68     2580
## Trinity College DC                                 19     49      309
## Westmont College                                   42     72     1276
## Vassar College                                     53     87     2164
## Keene State College                                 5     19     3480
## Rocky Mountain College                             11     31      743
## University of Vermont                              18     51     7353
## McMurry University                                 25     50      880
## Illinois Benedictine College                       22     47     1222
## University of the South                            46     83     1129
## University of Wisconsin-Stout                       9     32     6038
## Wartburg College                                   34     66     1295
## Clarke College                                     14     45      604
## University of San Francisco                        23     48     4309
## Salem-Teikyo University                            23     52      700
## Kansas Wesleyan University                         16     40      474
## Augustana College IL                               36     69     1950
## University of Maine at Presque Isle                10     40      974
## Stonehill College                                  25     69     2022
## Manchester College                                 23     63      909
## Millikin University                                29     62     1788
## Western New England College                         7     21     1803
## Beaver College                                     23     56      878
```

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## Stephens College                              17    34     614
## Allentown Coll. of St. Francis de Sales       38    64    1130
## Rutgers State University at Newark            26    62    4005
## Christopher Newport University                 3    37    2910
## Eckerd College                               33    65    1363
## Milligan College                             26    52     685
## Saint Olaf College                           38    73    2888
## Lock Haven University of Pennsylvania         17    41    3390
## Lakeland College                             24    47     887
## Greensboro College                           10    31     649
## Central Connecticut State University           6    24    6394
## Hobart and William Smith Colleges             25    53    1792
## Wesley College                               10    25     872
## Central Missouri State University            10    35    8094
## Rockhurst College                            22    50    1127
## Spelman College                              47    83    1971
## Bentley College                              20    60    3095
## Bluefield College                            15    30     653
## Western Michigan University                  24    53   15739
## Jersey City State College                    10    30    3817
## Bethel College KS                            19    42     537
## Xavier University                            24    47    2849
## Drake University                             34    65    3322
## College of Notre Dame of Maryland            35    61     667
## Belmont University                           28    67    1964
## Alma College                                 44    73    1306
## Jamestown College                            14    41    9950
## Wabash College                               41    76     801
## Virginia Union University                    19    59    1298
## Westminster College MO                       20    43     665
## Oakland University                           16    56    6441
## Auburn University-Main Campus                25    57   16262
## Illinois State University                    10    35   15701
## Wentworth Institute of Technology             6    25    2961
## Goshen College                               26    51     910
## Johnson State College                          3    13    1224
## York College of Pennsylvania                 28    63    2988
## Southwest Missouri State University          15    37   13131
## Butler University                            40    68    2607
## Lawrence University                          50    77    1129
## University of Richmond                       46    72    2854
## Hood College                                 36    64     710
## Brigham Young University at Provo            48    82   27378
## Rosary College                               28    53     624
## Campbell University                          20    54    3191
## Wingate College                              10    34    1207
## Rhodes College                               58    82    1345
## St. John Fisher College                      19    51    1687
## University of Scranton                       29    60    3674
## Franklin Pierce College                       3    14    1818
## Marshall University                          14    60    7703
## Mankato State University                       9    29    9649
## University of Oregon                         25    61   11669
## College of Notre Dame                        11    42     500
```

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## Kentucky Wesleyan College                          20    49     662
## Lycoming College                                    16    37    1363
## Cumberland College                                  26    47    1306
## Manhattanville College                              21    54     830
## Seton Hall University                               16    36    4384
## Lynchburg College                                    3    21    1524
## Union College NY                                    49    84    1915
## University of Illinois at Chicago                   22    50   13518
## Christian Brothers University                       16    42    1068
## University of Miami                                 42    69    7760
## Saint Mary's College of Minnesota                   14    35    1263
## Marymount University                                10    30    1247
## Wesleyan University                                 60    86    2714
## University of Sci. and Arts of Oklahoma             21    43    1140
## Immaculata College                                  16    44     494
## Fordham University                                  30    55    4740
## Mount Union College                                 26    61    1365
## Geneva College                                      19    39    1306
## Williams College                                    81    96    1988
## Averett College                                     16    40     777
## Northwest Nazarene College                          29    52    1115
## Virginia Wesleyan College                           20    49    1130
## University of Connecticut at Storrs                 23    63   12478
## University of Virginia                              74    95   11278
## Freed-Hardeman University                           20    54    1174
## Baker University                                    21    47     958
## Lewis University                                    12    31    2192
## Moorhead State University                           12    37    5983
## Saint Francis College                               21    45    1223
## University of Maine at Machias                      17    45     633
## Bennington College                                  25    53     457
## Guilford College                                    18    44    1410
## Bethel College                                      11    28     347
## Westfield State College                              3    20    3234
## Southern Illinois University at Edwardsville        13    40    6063
## Dowling College                                      9    33    1059
## Marian College of Fond du Lac                       15    41    1160
## Sioux Falls College                                 13    35     614
## Monmouth College IL                                 28    57     671
## Saint Mary-of-the-Woods College                     23    50     341
## Upper Iowa University                               10    35    1481
## Voorhees College                                    10    30     703
## Pacific University                                  41    71    1041
## Willamette University                               49    80    1595
## Siena Heights College                               10    31     686
## St. Thomas Aquinas College                          10    27    1117
## Washington and Lee University                       68    93    1584
## Alverno College                                     23    46    1317
## Claflin College                                     21    47     959
## University of Maine at Farmington                   20    48    1906
## Ramapo College of New Jersey                         6    29    2745
## Central College                                     31    65    1355
## Ursuline College                                    21    47     699
## Hardin-Simmons University                           16    40    1365
```

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## Fontbonne College                                16     49      981
## University of California at Irvine                85    100    12677
## Keuka College                                     10     43      738
## Beloit College                                    26     54     1085
## Baylor University                                 34     66     9919
## University of Detroit Mercy                        24     50     2149
## Samford University                                34     76     2959
## Southwestern Adventist College                    11     27      620
## Saint Xavier University                            15     65     1670
## Harvey Mudd College                               95    100      654
## Virginia Commonwealth University                  18     45    10262
## Arkansas Tech University                          12     52     3602
## New Mexico Institute of Mining and Tech.          40     73     1017
## Pennsylvania State Univ. Main Campus              48     93    28938
## Meredith College                                 25     58     1721
## SUNY College  at Oswego                           17     70     6943
## University of New England                        19     54      820
## Wells College                                    40     85      416
## Allegheny College                                44     77     1707
## McPherson College                                11     32      336
## Trinity College VT                               16     41      484
## Bridgewater College                              22     53      881
## Saint Vincent College                            19     35     1035
## Blackburn College                                25     55      421
## University of Mississippi                         26     47     7524
## Sacred Heart University                          19     51     1707
## Johns Hopkins University                         75     94     3566
## Clinch Valley Coll. of  the Univ. of Virginia    15     30     1125
## College of Saint Catherine                       23     51     1692
## Culver-Stockton College                          24     55      992
## Carroll College                                  19     55     1357
## Cedarville College                               25     55     2196
## Concordia College at St. Paul                    13     29     1049
## Philadelphia Coll. of Textiles and Sci.          19     42     1664
## Manhattan College                                20     63     2578
## Hiram College                                    37     66     1000
## Mississippi University for Women                 19     46     1673
## Yale University                                  95     99     5217
## Valparaiso University                            49     81     2501
## Barat College                                    15     36      453
## Hollins College                                  26     58      795
## Tulane University                                47     75     4941
## Waynesburg College                               12     30     1280
## Cornell College                                  33     68     1140
## Centenary College                                12     46      396
## Texas Lutheran College                           27     57      895
## West Virginia Wesleyan College                   28     55     1509
## Nazareth College of Rochester                    36     68     1274
## University of Pittsburgh-Main Campus             25     59    13138
## Saint Francis College IN                         13     36      513
## East Tennessee State University                  15     36     6706
## Baldwin-Wallace College                          30     61     2718
## University of West Florida                       20     57     3754
## Colgate University                               46     75     2649
```

```
## Wake Forest University                            75          88           3499
## Loyola Marymount University                        42          64           3558
## SUNY College at Buffalo                             8          29           7626
## Montclair State University                         19          53           6411
## University of Delaware                             22          57          14130
## Marquette University                               36          71           7016
## William Woods University                           17          39            851
## University of South Carolina at Aiken              14          24           1855
## Fresno Pacific College                             51          87            704
## Saint Joseph's University                          39          71           2473
## West Chester University of Penn.                   11          51           7484
## Emory University                                   76          97           5544
## Texas Southern University                          15          85           5584
## Saint Joseph's College                             12          33            716
## Loyola University Chicago                          25          55           5244
## Whitman College                                    45          77           1220
## Southwest State University                         13          33           2091
## Roger Williams University                          10          20           2111
## Ohio Wesleyan University                           36          65           1780
## Houghton College                                   30          70           1210
## Green Mountain College                              7          20            545
## Wellesley College                                  80          96           2195
## Saint Ambrose University                           12          48           1345
## Huntington College                                 20          46            488
## Barry University                                   18          45           1811
## Wheeling Jesuit College                            15          49            971
## Eastern College                                    16          42           1057
## Whitworth College                                  43          70           1270
## Fayetteville State University                       1          16           2632
## Western State College of Colorado                  7          24           2315
## Skidmore College                                   25          62           2322
## California State University at Fresno               5          60          13494
## Rensselaer Polytechnic Institute                   53          82           4291
## Saint Anselm College                               15          40           1873
## Adrian College                                     22          50           1036
## University of North Carolina at Charlotte          19          62          10099
## Wheaton College IL                                 56          84           2200
## Louisiana Tech University                          22          45           6720
## Bellarmine College                                 39          63           1198
## Loyola College                                     25          54           3010
## Polytechnic University                             58          89           1379
## University of Southern California                  45          71          13259
## University of Mobile                               17          54           1417
## John Brown University                              24          53            961
## SUNY College at Geneseo                            56          93           5060
## Mount Marty College                                17          37            600
## Grace College and Seminary                         18          46            618
##                                           P.Undergrad Outstate Room.Board
## North Central College                             766    11718       7398
## Gordon College                                     39    12200       4070
## Indiana University at Bloomington                2717     9766       3990
## Juniata College                                    43    14850       4460
## Niagara University                                334    10320       4762
## Point Park College                               1402     9700       4830
```

```
## College of Saint Benedict                        103   12247   4221
## Capital University                                960   13050   4000
## University of Massachusetts at Dartmouth         1630    6919   4500
## Cedar Crest College                               764   14340   5285
## Canisius College                                  434   10750   5340
## Elmira College                                    502   14990   4980
## Longwood College                                  118    7920   3962
## New York University                              2814   17748   7262
## University of Southern Mississippi               1387    4652   2470
## Augsburg College                                  726   11902   4372
## Huron University                                   69    7260   3090
## Southwestern College                              147    7200   3532
## College of Santa Fe                               683   11138   4138
## Simmons College                                   160   16160   6950
## Daniel Webster College                            536   12292   4934
## Southern California College                       127    9520   4124
## Marywood College                                  402   11040   4500
## Maryville College                                 128   11200   4208
## Stetson University                                 81   12315   4565
## Webster University                               1550    9160   4340
## North Dakota State University                    1128    5834   2744
## Wayne State College                               474    2700   2660
## North Park College                                156   12580   4345
## King's College                                    541   10910   5160
## University of Wisconsin at Madison               2200    9096   4290
## Dickinson State University                        237    4486   2146
## Washington State University                      1344    8200   4210
## Eastern Mennonite College                          59    9650   3800
## University of Tennessee at Knoxville             3237    5764   3262
## Mount Vernon Nazarene College                      94    7400   3346
## University of Kansas                             1673    6994   3384
## Rowan College of New Jersey                      3942    4356   4830
## Lyndon State College                              150    7320   4640
## Hastings College                                   37    9376   3272
## Ohio University                                  1310    7629   4095
## George Washington University                     1470   17450   6328
## St. Martin's College                              574   11550   4270
## Western Washington University                     506    8124   4144
## University of Wisconsin at Milwaukee             7443    8786   2964
## Capitol College                                   331    8400   2812
## Marymount College Tarrytown                       370   11510   6450
## Westminster College PA                             30   18460   5970
## University of Oklahoma                           2582    5173   3526
## Texas Wesleyan University                         392    6400   3484
## University of Puget Sound                         138   16230   4500
## Washington College                                 46   15276   5318
## Point Loma Nazarene College                       217   10178   4190
## California Lutheran University                    432   12950   5300
## Northwest Missouri State University               472    3735   3136
## Berry College                                      49    8050   3940
## Hope College                                      208   12275   4341
## Bemidji State University                          824    4425   2700
## South Dakota State University                    1103    3811   2190
## Southwestern University                            43   11850   4675
```

```
## Fairfield University                                1037    15000    6200
## University of Cincinnati                             2011     8907    4697
## Saint Cloud State University                         2206     4259    2625
## University of Charleston                              611     9500    3540
## Boston University                                    3113    18420    6810
## Lenoir-Rhyne College                                  166    10100    4000
## Colorado State University                            1829     8412    4180
## Creighton University                                  644    10628    4372
## George Fox College                                     43    12500    4130
## Bethune Cookman College                                82     5188    3396
## University of Maryland at Baltimore County           2592     8594    4408
## Georgia State University                             9054     6744    2655
## Rivier College                                       1196     9870    4860
## Colorado College                                        7    17142    4190
## University of Utah                                   8374     6857    3975
## University of Nebraska at Lincoln                    3171     5595    3145
## Georgian Court College                                785     9150    3950
## University of South Carolina at Columbia             3661     8074    3522
## Marist College                                        658    10700    5925
## James Madison University                              742     7994    4544
## Brenau University                                     479     9592    5879
## Pacific Union College                                 139    11925    3825
## Defiance College                                      283    10850    3670
## Husson College                                        706     7800    4000
## Mount Saint Mary College                              429     7470    4600
## Transylvania University                                51    10900    4450
## Eureka College                                         16    10955    3450
## Siena College                                         616    10800    5100
## Pace University                                       4379    11000    5160
## College of Saint Rose                                 894     9990    5666
## Gettysburg College                                     46    19964    4328
## Mary Washington College                               736     6490    4942
## Converse College                                       80    12050    3700
## Belmont Abbey College                                 131     9000    4850
## University of Minnesota at Duluth                    1254     8828    3474
## Concordia University CA                               101    10800    4440
## Washington University                                1274    18350    5775
## Northeast Missouri State University                   266     4856    3416
## Scripps College                                         7    17238    7350
## University of North Carolina at Greensboro           1847     8677    3505
## University of Michigan at Ann Arbor                  1339    15732    4659
## Albertson College                                      41    13500    3335
## Arizona State University Main campus                 7585     7434    4850
## Hartwick College                                       67    17480    4780
## Virginia State University                             338     5587    4845
## University of Illinois - Urbana                       911     7560    4574
## DePauw University                                      36    14300    5020
## Linfield College                                      840    13380    4210
## College Misericordia                                  493    10860    5760
## East Carolina University                             1687     7248    3240
## Adelphi University                                   1227    12280    6450
## Florida International University                     9310     6597    2494
## Central Wesleyan College                               33     8300    3080
## Worcester State College                              2029     6797    3900
```

```
## St. Bonaventure University                          131    10456    4927
## Rutgers State University at Camden                  1300     7411    4748
## Trinity College CT                                   244    18810    5690
## Morris College                                        12     4515    2550
## Quincy University                                      72    10100    4140
## Morningside College                                   228    10520    3678
## Livingstone College                                    11     4400    3400
## Carleton College                                       12    19292    3957
## Sweet Briar College                                    41    14500    6000
## Coe College                                           205    13925    4390
## Clemson University                                    770     8116    3610
## University of Dubuque                                 131    10430    3620
## Amherst College                                         5    19760    5300
## Brown University                                      349    19528    5926
## Ferrum College                                         82     9400    4200
## Cazenovia College                                      12     9384    4840
## College of St. Scholastica                           275    11844    3696
## Tusculum College                                       40     7700    3400
## Eastern Connecticut State University                 1531     5962    4316
## Our Lady of the Lake University                       942     8530    3644
## Harvard University                                    320    18485    6410
## Dillard University                                     45     6700    3650
## University of Arkansas at Fayetteville               1530     5028    3300
## Westminster College                                    72    12065    3615
## University of Hartford                               1415    14220    6000
## Villanova University                                 1292    15925    6507
## Buena Vista College                                   442    13306    3797
## Indiana State University                             1949     6892    3706
## Southeast Missouri State University                  1246     4680    3540
## Norwich University                                    382    14134    5270
## St. Norbert College                                    95    12140    4450
## Franklin College                                       68    10390    4040
## Lehigh University                                     132    18700    5580
## Drew University                                        87    18432    5616
## University of Montevallo                              331     4440    3030
## Hamilton College                                       24    19700    5050
## Oklahoma Christian University                         228     6400    3150
## Smith College                                          95    18820    6390
## Bowling Green State University                       1213     7452    3352
## Spring Arbor College                                  353     8600    3550
## Saint Joseph College                                  712    12200    4600
## Mount St. Mary's College                              466    12474    5678
## Pacific Lutheran University                           302    13312    4488
## Trinity College DC                                    639    11412    6430
## Westmont College                                        9    14320    5304
## Vassar College                                         77    18920    5950
## Keene State College                                   776     7870    4157
## Rocky Mountain College                                118     8734    3362
## University of Vermont                                1674    15516    4928
## McMurry University                                    477     6930    3452
## Illinois Benedictine College                         519    10500    4348
## University of the South                               24    15350    4080
## University of Wisconsin-Stout                         579     6704    2592
## Wartburg College                                      105    11600    3610
```

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## Clarke College                                    350    10740    3676
## University of San Francisco                        549    13226    6452
## Salem-Teikyo University                             45    10575    3952
## Kansas Wesleyan University                         258     8400    3250
## Augustana College IL                               38    13353    4173
## University of Maine at Presque Isle               503     6600    3630
## Stonehill College                                 926    12170    6172
## Manchester College                                 51    10440    3850
## Millikin University                                95    11910    4378
## Western New England College                      1116     8994    5500
## Beaver College                                    519    12850    5400
## Stephens College                                  388    13900    5200
## Allentown Coll. of St. Francis de Sales           638     9690    4785
## Rutgers State University at Newark               1886     7410    4748
## Christopher Newport University                   1749     7860    4750
## Eckerd College                                     23    15360    4080
## Milligan College                                   49     8200    3300
## Saint Olaf College                                105    14350    3750
## Lock Haven University of Pennsylvania            325     7352    3620
## Lakeland College                                 1957     9400    4005
## Greensboro College                                314     8330    3770
## Central Connecticut State University             3881     5962    4444
## Hobart and William Smith Colleges                  5    19029    5841
## Wesley College                                    448     9890    4674
## Central Missouri State University               1596     4620    3288
## Rockhurst College                                 754     9490    4100
## Spelman College                                   107     7000    5565
## Bentley College                                  1533    13800    5510
## Bluefield College                                 129     7150    4350
## Western Michigan University                      4278     6940    4100
## Jersey City State College                        1394     3946    4800
## Bethel College KS                                 101     8540    3580
## Xavier University                                1107    11520    4960
## Drake University                                  726    13420    4770
## College of Notre Dame of Maryland               1983    11180    5620
## Belmont University                                623     7800    3664
## Alma College                                       28    12572    4552
## Jamestown College                                  71     7620    3050
## Wabash College                                      5    12925    4195
## Virginia Union University                          67     7384    3494
## Westminster College MO                            37    10720    4050
## Oakland University                               3982     9114    4030
## Auburn University-Main Campus                    1716     6300    3933
## Illinois State University                        1823     7799    3403
## Wentworth Institute of Technology                572     9850    6050
## Goshen College                                    166     9420    3730
## Johnson State College                             345     7656    4690
## York College of Pennsylvania                    1726     4990    3560
## Southwest Missouri State University             3374     4740    2590
## Butler University                                 148    13130    4650
## Lawrence University                                74    17163    3891
## University of Richmond                            594    14500    3285
## Hood College                                      399    13960    6040
## Brigham Young University at Provo                1253     2340    3580
```

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## Rosary College                                     269    10950    4600
## Campbell University                                1204     7550    2790
## Wingate College                                     157     7820    3400
## Rhodes College                                       59    15200    4768
## St. John Fisher College                             677    10570    5600
## University of Scranton                              493    11584    5986
## Franklin Pierce College                            1197    13320    4630
## Marshall University                                2339     5094    4010
## Mankato State University                           1792     4300    2643
## University of Oregon                               1605    10602    3660
## College of Notre Dame                               331    12600    5520
## Kentucky Wesleyan College                           121     8000    4150
## Lycoming College                                     74    13900    4300
## Cumberland College                                  122     6230    3526
## Manhattanville College                              150    14700    6550
## Seton Hall University                              1530    12000    6484
## Lynchburg College                                   280    12450    5400
## Union College NY                                    123    18732    6204
## University of Illinois at Chicago                  2916     7230    5088
## Christian Brothers University                       364     9300    3260
## University of Miami                                 876    16500    6526
## Saint Mary's College of Minnesota                   118    10800    3600
## Marymount University                                776    11390    5280
## Wesleyan University                                  27    19130    5600
## University of Sci. and Arts of Oklahoma             473     3687    1920
## Immaculata College                                 1305    10000    5364
## Fordham University                                 1646    14235    6965
## Mount Union College                                 144    12250    3530
## Geneva College                                      258     9476    4820
## Williams College                                     29    19629    5790
## Averett College                                     538     9925    4135
## Northwest Nazarene College                           60     9840    2820
## Virginia Wesleyan College                           417    10900    5100
## University of Connecticut at Storrs                1660    11656    5072
## University of Virginia                              114    12212    3792
## Freed-Hardeman University                            50     5500    3340
## Baker University                                    466     8620    4100
## Lewis University                                   1423    10560    4520
## Moorhead State University                          1075     4426    2664
## Saint Francis College                               451    10880    5050
## University of Maine at Machias                      317     6600    3680
## Bennington College                                    2    21700    4100
## Guilford College                                    299    13404    5160
## Bethel College                                       74     6200    2900
## Westfield State College                             941     5542    3788
## Southern Illinois University at Edwardsville       2550     5472    3598
## Dowling College                                    2458     9000    3100
## Marian College of Fond du Lac                       653     9400    3400
## Sioux Falls College                                 271     8990    3064
## Monmouth College IL                                  11    13000    4100
## Saint Mary-of-the-Woods College                    768    10300    4130
## Upper Iowa University                              1160     8840    3060
## Voorhees College                                     20     4450    2522
## Pacific University                                   35    14210    3994
```

```
## Willamette University                                    159    14800    4620
## Siena Heights College                                    287     9240    3880
## St. Thomas Aquinas College                               815     8650    5700
## Washington and Lee University                              3    13750    4619
## Alverno College                                         1235     8352    3640
## Claflin College                                           13     4412    2460
## University of Maine at Farmington                        344     6810    3970
## Ramapo College of New Jersey                            1938     4449    4860
## Central College                                           40    10938    3660
## Ursuline College                                         717     9600    4202
## Hardin-Simmons University                                334     6300    2980
## Fontbonne College                                        337     8390    4100
## University of California at Irvine                       864    12024    5302
## Keuka College                                             55     9600    4550
## Beloit College                                            81    16304    3616
## Baylor University                                        484     6450    3920
## University of Detroit Mercy                             2217    11130    3996
## Samford University                                       402     8236    3700
## Southwestern Adventist College                          280     7536    3736
## Saint Xavier University                                  726    10860    4624
## Harvey Mudd College                                        5    17230    6690
## Virginia Commonwealth University                       5065    10217    4182
## Arkansas Tech University                                 939     3460    2650
## New Mexico Institute of Mining and Tech.                411     5376    3214
## Pennsylvania State Univ. Main Campus                    2025    10645    4060
## Meredith College                                         470     6720    3250
## SUNY College  at Oswego                                  869     6550    4810
## University of New England                                159    11450    5045
## Wells College                                             19    14900    5550
## Allegheny College                                         44    17080    4440
## McPherson College                                         80     7950    3750
## Trinity College VT                                       541    11010    5208
## Bridgewater College                                       55    10265    4725
## Saint Vincent College                                    182    10850    3936
## Blackburn College                                         27     6500    2700
## University of Mississippi                                804     4916    3810
## Sacred Heart University                                 1889    11070    5780
## Johns Hopkins University                                1569    18800    6740
## Clinch Valley Coll. of  the Univ. of Virginia           422     7168    3689
## College of Saint Catherine                              562    12224    4440
## Culver-Stockton College                                 112     8000    3700
## Carroll College                                          737    12200    3880
## Cedarville College                                        82     7344    4410
## Concordia College at St. Paul                            181    10500    3750
## Philadelphia Coll. of Textiles and Sci.                1042    11690    5062
## Manhattan College                                        254    12370    6800
## Hiram College                                            275    14067    4560
## Mississippi University for Women                        1014     4386    2217
## Yale University                                           83    19840    6510
## Valparaiso University                                    198    11800    3260
## Barat College                                            266     9690    4300
## Hollins College                                           74    13470    5515
## Tulane University                                       1534    19040    5950
## Waynesburg College                                        61     8840    3620
```

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## Cornell College                                    10    15248    4323
## Centenary College                                  526    11400    5400
## Texas Lutheran College                             429     7850    3410
## West Virginia Wesleyan College                     170    14200    3775
## Nazareth College of Rochester                      471    10850    5150
## University of Pittsburgh-Main Campus              4289    10786    4560
## Saint Francis College IN                           247     8670    3820
## East Tennessee State University                   2640     5800    3000
## Baldwin-Wallace College                           1460    10995    4410
## University of West Florida                         2477     6172    3994
## Colgate University                                  25    19510    5565
## Wake Forest University                             172    13850    4360
## Loyola Marymount University                        436    13592    5916
## SUNY College at Buffalo                           2091     6550    4040
## Montclair State University                        3186     3648    4834
## University of Delaware                            4522    10220    4230
## Marquette University                               804    11610    4760
## William Woods University                           120    10535    4365
## University of South Carolina at Aiken             1412     5800    3066
## Fresno Pacific College                             63     9900    3670
## Saint Joseph's University                         1314    12750    6350
## West Chester University of Penn.                  1904     7844    4108
## Emory University                                   192    17600    6000
## Texas Southern University                         3101     7860    3360
## Saint Joseph's College                            2196     9985    5180
## Loyola University Chicago                         3417    11500    5330
## Whitman College                                    46    16670    4900
## Southwest State University                         546     4285    2750
## Roger Williams University                         1489    12520    6050
## Ohio Wesleyan University                           48    16732    5650
## Houghton College                                   26     9990    3550
## Green Mountain College                             42    11750    2700
## Wellesley College                                  156    18345    5995
## Saint Ambrose University                           390    10450    4020
## Huntington College                                 43     9950    3920
## Barry University                                  3144    11290    5360
## Wheeling Jesuit College                            305    10500    4545
## Eastern College                                    355    11190    4800
## Whitworth College                                  160    12660    4500
## Fayetteville State University                      617     6806    2550
## Western State College of Colorado                 146     5918    3755
## Skidmore College                                   263    18710    5970
## California State University at Fresno             1254     7706    4368
## Rensselaer Polytechnic Institute                   16    17475    5976
## Saint Anselm College                               94    12950    5400
## Adrian College                                     99    11250    3750
## University of North Carolina at Charlotte         3255     7248    3109
## Wheaton College IL                                 56    11480    4200
## Louisiana Tech University                         1822     3957    2325
## Bellarmine College                                 605     8840    2950
## Loyola College                                     184    12990    6300
## Polytechnic University                             214    16200    4200
## University of Southern California                 1429    17230    6482
## University of Mobile                               301     6150    3680
```

```
## John Brown University                             99      6398      3672
## SUNY College at Geneseo                          146      6550      4170
## Mount Marty College                              435      6844      2980
## Grace College and Seminary                       113      8958      3670
##                                         Books Personal PhD Terminal
## North Central College                    450     1800  73       87
## Gordon College                           400     1200  73       82
## Indiana University at Bloomington        600     2000  77       88
## Juniata College                          450      420  97       97
## Niagara University                       450      650  68      100
## Point Park College                       400     1200  45       90
## College of Saint Benedict                500      600  70       88
## Capital University                       500      800  64       69
## University of Massachusetts at Dartmouth 500     1250  74       90
## Cedar Crest College                      500     1000  58       83
## Canisius College                         400     1130  90       92
## Elmira College                           450      550  77       98
## Longwood College                         550     2200  74       80
## New York University                      450     1000  87       98
## University of Southern Mississippi       500      500  78       99
## Augsburg College                         540      950  65       65
## Huron University                         600     1840  31       35
## Southwestern College                     550     1500  56       56
## College of Santa Fe                      600     1200  40       74
## Simmons College                          500     1200  74       81
## Daniel Webster College                   500      500  61       61
## Southern California College              630     1818  63       65
## Marywood College                         600      700  65       76
## Maryville College                        500     1642  80       90
## Stetson University                       600     1365  85       90
## Webster University                       500      500  68       68
## North Dakota State University            600     2000  79       83
## Wayne State College                      540     1660  60       68
## North Park College                       400      970  76       79
## King's College                           400     1795  66       72
## University of Wisconsin at Madison       535     1545  93       96
## Dickinson State University               600     2000  50       64
## Washington State University              800     2719  84       87
## Eastern Mennonite College                600     1300  46       65
## University of Tennessee at Knoxville     750     3300  86       92
## Mount Vernon Nazarene College            600      600  57       57
## University of Kansas                     700     2681  88       94
## Rowan College of New Jersey              800      800  76       81
## Lyndon State College                     500      600  48       65
## Hastings College                         500     1902  57       63
## Ohio University                          550     2300  79       87
## George Washington University             700      950  92       93
## St. Martin's College                     300      500  43       77
## Western Washington University            639     2385  83       89
## University of Wisconsin at Milwaukee     570     1980  79       87
## Capitol College                          300     2134  10       50
## Marymount College Tarrytown              575     1075  71       93
## Westminster College PA                   700      850  92       96
## University of Oklahoma                   765     3176  86       90
```

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## Texas Wesleyan University                         600    1800   80      83
## University of Puget Sound                          630    1800   79      86
## Washington College                                500     300   79      86
## Point Loma Nazarene College                        800     750   71      71
## California Lutheran University                     612     576   72      74
## Northwest Missouri State University               250    1630   62      65
## Berry College                                     350    2375   80      80
## Hope College                                      465    1100   72      81
## Bemidji State University                          660    1800   57      62
## South Dakota State University                     500    1970   62      65
## Southwestern University                           600    1050   83      89
## Fairfield University                              700    1100   86      90
## University of Cincinnati                          556    1851   89      95
## Saint Cloud State University                      350    1884   70      75
## University of Charleston                          400     750   26      58
## Boston University                                 475    1025   80      81
## Lenoir-Rhyne College                              400    1000   88      92
## Colorado State University                         470    1800   87      89
## Creighton University                              650    2055   85      90
## George Fox College                                400    1050   53      53
## Bethune Cookman College                           650    2500   48      48
## University of Maryland at Baltimore County        494    2768   82      88
## Georgia State University                          720    3450   87      89
## Rivier College                                    600    1100   59      59
## Colorado College                                  450    1200   85      97
## University of Utah                                858    3093   89      93
## University of Nebraska at Lincoln                 500    2070   86      92
## Georgian Court College                            500     800   56      59
## University of South Carolina at Columbia          495    2941   84      88
## Marist College                                    550    1200   74      81
## James Madison University                          500     732   77      81
## Brenau University                                 500     700   71      80
## Pacific Union College                             630    1926   48      87
## Defiance College                                  400    1159   58      60
## Husson College                                    350    1500   36      44
## Mount Saint Mary College                          250    1400   74      75
## Transylvania University                           500    1000   81      91
## Eureka College                                    330     670   62      87
## Siena College                                     575    1090   71      82
## Pace University                                   660    1115   90      95
## College of Saint Rose                             800    1500   66      71
## Gettysburg College                                500     500   94      95
## Mary Washington College                           650    2102   75      80
## Converse College                                  500     900   63      76
## Belmont Abbey College                             300    2480   78      85
## University of Minnesota at Duluth                 753    2610   79      91
## Concordia University CA                           570    1515   55      60
## Washington University                             768    1512   91      98
## Northeast Missouri State University               400    1100   69      72
## Scripps College                                   600     800   95     100
## University of North Carolina at Greensboro        600    1300   75      94
## University of Michigan at Ann Arbor               476    1600   90      98
## Albertson College                                 500     675   67      73
## Arizona State University Main campus              700    2100   88      93
```

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## Hartwick College                            500       700   75        87
## Virginia State University                   500       600   61        63
## University of Illinois - Urbana             500      1982   87        90
## DePauw University                           550       950   78        94
## Linfield College                            500       900   89        91
## College Misericordia                        550       900   56        62
## East Carolina University                    500      1700   74        78
## Adelphi University                          750      1500   29        30
## Florida International University            800      3028   81        96
## Central Wesleyan College                    600       600   62        62
## Worcester State College                     500      1200   60        60
## St. Bonaventure University                  500      1050   91        91
## Rutgers State University at Camden          690      2009   90        95
## Trinity College CT                          500       680   91        96
## Morris College                              850      2100   53        60
## Quincy University                           450      1080   69        71
## Morningside College                         500      1000   48        68
## Livingstone College                         800       900   53        93
## Carleton College                            550       550   81        93
## Sweet Briar College                         500       600   91        99
## Coe College                                 500      2200   73        86
## Clemson University                          800      1618   82        88
## University of Dubuque                        400      1500   85        98
## Amherst College                             660      1598   93        98
## Brown University                            720      1100   99       100
## Ferrum College                              500      1600   53        58
## Cazenovia College                           600       500   22        47
## College of St. Scholastica                  450      1146   54        76
## Tusculum College                            450       800   70        70
## Eastern Connecticut State University        650       500   71        76
## Our Lady of the Lake University             616      1576   56        64
## Harvard University                          500      1920   97        97
## Dillard University                          500      2307   52        52
## University of Arkansas at Fayetteville      500      2000   73        89
## Westminster College                         430       685   62        78
## University of Hartford                       500      1440   61        76
## Villanova University                        400       300   89        90
## Buena Vista College                         450       950   62        69
## Indiana State University                    600      2500   72        76
## Southeast Missouri State University         200      2150   75        76
## Norwich University                          500       800   71        74
## St. Norbert College                         425      1100   74        78
## Franklin College                            525      1345   54        78
## Lehigh University                           750      1130   96        99
## Drew University                             520       660   93        97
## University of Montevallo                    300       600   72        72
## Hamilton College                            300       800   91        96
## Oklahoma Christian University               500      1900   58        64
## Smith College                               500      1050   85        97
## Bowling Green State University              600      1700   81        89
## Spring Arbor College                        385       665   48        48
## Saint Joseph College                        650       950   87        90
## Mount St. Mary's College                    630      1278   53        71
## Pacific Lutheran University                 600      1516   78        78
```

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## Trinity College DC                          500    900  89    93
## Westmont College                            490   1410  77    77
## Vassar College                              600    800  90    98
## Keene State College                         500   1150  73    73
## Rocky Mountain College                      600    625  56    78
## University of Vermont                       500    990  87    90
## McMurry University                          400   1525  57    64
## Illinois Benedictine College               650   1500  81    91
## University of the South                     450    810  89    93
## University of Wisconsin-Stout               376   1750  78    78
## Wartburg College                           400    850  66    91
## Clarke College                             350    900  67    71
## University of San Francisco                 750   2450  86    86
## Salem-Teikyo University                     400    620  46    24
## Kansas Wesleyan University                  500   1400  63    55
## Augustana College IL                       540    821  78    83
## University of Maine at Presque Isle         400   1675  67    67
## Stonehill College                          480    800  79    79
## Manchester College                         525   1450  63    72
## Millikin University                        450    965  60    77
## Western New England College                498   2065  74    97
## Beaver College                             400    800  78    89
## Stephens College                           450   2150  46    63
## Allentown Coll. of St. Francis de Sales     600   1000  60    84
## Rutgers State University at Newark          690   2009  90    95
## Christopher Newport University              525   1889  80    82
## Eckerd College                             600   1000  82    89
## Milligan College                           550   1000  63    69
## Saint Olaf College                         550    550  82    88
## Lock Haven University of Pennsylvania       225    500  47    55
## Lakeland College                           500   1000  49    65
## Greensboro College                         550   1300  64    80
## Central Connecticut State University        500    985  69    73
## Hobart and William Smith Colleges           600    600  99    99
## Wesley College                             500   1350  52    57
## Central Missouri State University           300   2250  69    80
## Rockhurst College                          500   1500  60    79
## Spelman College                            660   2400  73    80
## Bentley College                            630    850  87    87
## Bluefield College                          450   1500  61    67
## Western Michigan University                 500   1700  80    84
## Jersey City State College                  400   1500  63    67
## Bethel College KS                          500   1400  61    80
## Xavier University                          600   1250  73    75
## Drake University                           560   1675  88    93
## College of Notre Dame of Maryland          600    700  64    64
## Belmont University                         650    900  61    61
## Alma College                               400    400  79    87
## Jamestown College                          400    400  51    53
## Wabash College                             500    635  78    85
## Virginia Union University                  500   1763  51    67
## Westminster College MO                     600   1650  66    70
## Oakland University                         400    650  88    90
## Auburn University-Main Campus              600   1908  85    91
```

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## Illinois State University                        537    2605   77    84
## Wentworth Institute of Technology                 850     920   10    68
## Goshen College                                    600    1230   51    56
## Johnson State College                             500     624   80    91
## York College of Pennsylvania                      500    1250   75    75
## Southwest Missouri State University               500    1360   70    75
## Butler University                                 500    1600   77    81
## Lawrence University                               525     975   76    92
## University of Richmond                            700    1125   75    89
## Hood College                                      450     690   82    88
## Brigham Young University at Provo                 860    1220   76    76
## Rosary College                                    550     950   79    82
## Campbell University                               600     500   77    77
## Wingate College                                   550    1550   69    81
## Rhodes College                                    550    1500   90    96
## St. John Fisher College                           400     800   86    81
## University of Scranton                            650     800   83    83
## Franklin Pierce College                           500     800   50    56
## Marshall University                               700    1560   77    86
## Mankato State University                          450    1660   57    68
## University of Oregon                              570    1530   79    87
## College of Notre Dame                             630    2250   77    80
## Kentucky Wesleyan College                         500    1300   57    65
## Lycoming College                                  500     900   75    81
## Cumberland College                                400     600   42    44
## Manhattanville College                            450     400   97    97
## Seton Hall University                             650    1000   81    84
## Lynchburg College                                 450     870   62    66
## Union College NY                                  450    1024   94    96
## University of Illinois at Chicago                 630    3228   82    84
## Christian Brothers University                     600     900   81    81
## University of Miami                               630    1985   82    94
## Saint Mary's College of Minnesota                 400     820   68    74
## Marymount University                              500     750   77    82
## Wesleyan University                              1400    1400   90    94
## University of Sci. and Arts of Oklahoma           600    1800   67    77
## Immaculata College                                500    1000   56    64
## Fordham University                                600    1735   86    97
## Mount Union College                               400    1150   85    87
## Geneva College                                    500    1100   67    67
## Williams College                                  500    1200   94    99
## Averett College                                   750    1350   59    67
## Northwest Nazarene College                        450     822   59    59
## Virginia Wesleyan College                         500     550   70    81
## University of Connecticut at Storrs               700    2300   89    95
## University of Virginia                            500    1000   90    92
## Freed-Hardeman University                         600    1600   68    76
## Baker University                                  400    2250   58    68
## Lewis University                                  500    1200   36    48
## Moorhead State University                         600    1000   76    81
## Saint Francis College                             400    1235   64    64
## University of Maine at Machias                    600     400   46    46
## Bennington College                                600     500   35    59
## Guilford College                                  450    1050   78    86
```

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## Bethel College                                      600     800   63        63
## Westfield State College                             500    1300   75        79
## Southern Illinois University at Edwardsville         221    2216   76        81
## Dowling College                                     450    1413   77        78
## Marian College of Fond du Lac                        500    1100   37        37
## Sioux Falls College                                 500    1700   73        73
## Monmouth College IL                                  400     460   91        91
## Saint Mary-of-the-Woods College                     500    1700   44        58
## Upper Iowa University                                500    1000   69        75
## Voorhees College                                     500    1200   43        43
## Pacific University                                   450    1100   76        76
## Willamette University                                400     790   91        94
## Siena Heights College                                475    1090   29        49
## St. Thomas Aquinas College                          500    1750   69        73
## Washington and Lee University                        680    1115   81        96
## Alverno College                                      650    2449   36        69
## Claflin College                                      500    1000   69        69
## University of Maine at Farmington                    450    1647   67        75
## Ramapo College of New Jersey                         600    1655   74        95
## Central College                                      650     600   76        90
## Ursuline College                                     450     750   39        69
## Hardin-Simmons University                            700    2140   75        79
## Fontbonne College                                    350    1500   45        55
## University of California at Irvine                   790    1818   96        96
## Keuka College                                        600     750   55        94
## Beloit College                                       355     715   87        95
## Baylor University                                    600    1346   71        76
## University of Detroit Mercy                          600    2166   72        79
## Samford University                                   569    1650   74        75
## Southwestern Adventist College                       430    1651   44        77
## Saint Xavier University                              600     794   87       100
## Harvey Mudd College                                  700     900  100       100
## Virginia Commonwealth University                     500    3630   81        87
## Arkansas Tech University                             450    1000   57        60
## New Mexico Institute of Mining and Tech.             600    1100   99       100
## Pennsylvania State Univ. Main Campus                 512    2394   77        96
## Meredith College                                     450    1520   77        82
## SUNY College  at Oswego                              500    1500   69        85
## University of New England                            900    2500   72        75
## Wells College                                        600     500   93        98
## Allegheny College                                    400     600   73        91
## McPherson College                                    600    2740   54        54
## Trinity College VT                                   550     500   58        78
## Bridgewater College                                  560     875   68        73
## Saint Vincent College                                500     900   62        64
## Blackburn College                                    500    1000   76        76
## University of Mississippi                            600     550   81        86
## Sacred Heart University                              400     600   71        73
## Johns Hopkins University                             500    1040   96        97
## Clinch Valley Coll. of  the Univ. of Virginia        600    1900   67        67
## College of Saint Catherine                           450    1000   63        87
## Culver-Stockton College                              400     500   51        52
## Carroll College                                      480     930   74        81
## Cedarville College                                   570    1000   50        52
```

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## Concordia College at St. Paul                450     950   69      75
## Philadelphia Coll. of Textiles and Sci.      600    1664   48      80
## Manhattan College                            500    1800   92      92
## Hiram College                                400    1000   75      95
## Mississippi University for Women             600    1500   49      54
## Yale University                              630    2115   96      96
## Valparaiso University                        500     800   87      89
## Barat College                                500     500   57      77
## Hollins College                              500     850   78      91
## Tulane University                            350     800   98      98
## Waynesburg College                           500    1200   57      58
## Cornell College                              550     800   71      76
## Centenary College                            500     760   41      85
## Texas Lutheran College                       490    1700   54      58
## West Virginia Wesleyan College               450    1100   58      81
## Nazareth College of Rochester                550     800   77      93
## University of Pittsburgh-Main Campus         400     900   93      93
## Saint Francis College IN                     450    1000   43      78
## East Tennessee State University              600    2200   73      75
## Baldwin-Wallace College                     1000    1000   68      74
## University of West Florida                   541    1387   83      87
## Colgate University                           500     750   95      98
## Wake Forest University                       500    1250   95      97
## Loyola Marymount University                  545    1328   84      88
## SUNY College at Buffalo                      550    1230   71      78
## Montclair State University                   700     950   82      87
## University of Delaware                       530    1300   82      87
## Marquette University                         600    1950   86      94
## William Woods University                     550    3700   39      66
## University of South Carolina at Aiken        500    1500   62      62
## Fresno Pacific College                       630    1818   59      59
## Saint Joseph's University                    350    1690   84      90
## West Chester University of Penn.             400    2000   76      79
## Emory University                             600     870   97      98
## Texas Southern University                    600    1700   65      75
## Saint Joseph's College                       500     800   53      89
## Loyola University Chicago                    700    2000   94      95
## Whitman College                              750     800   80      83
## Southwest State University                   600    1800   58      75
## Roger Williams University                    500     730   44      54
## Ohio Wesleyan University                     550     550   93      93
## Houghton College                             500    1500   85      90
## Green Mountain College                       400     850   77      83
## Wellesley College                            500     700   94      98
## Saint Ambrose University                     500    1500   56      56
## Huntington College                           300    1300   76      76
## Barry University                             600    1800   76      78
## Wheeling Jesuit College                      600     600   66      71
## Eastern College                              450    1230   60      60
## Whitworth College                            678    2424   80      80
## Fayetteville State University                350     766   75      75
## Western State College of Colorado            500    2050   76      79
## Skidmore College                             500     700   87      92
## California State University at Fresno        600    1926   90      90
```

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## Rensselaer Polytechnic Institute             1230    1100 94      98
## Saint Anselm College                          450    1120 70      82
## Adrian College                                400    1165 53      66
## University of North Carolina at Charlotte     600    1900 79      91
## Wheaton College IL                            530    1400 81      83
## Louisiana Tech University                     618    1656 66      77
## Bellarmine College                            750    1290 74      82
## Loyola College                                600     900 86      88
## Polytechnic University                        436    2486 90      90
## University of Southern California             600    2210 90      94
## University of Mobile                          550    1200 59      63
## John Brown University                         400    1350 68      68
## SUNY College at Geneseo                       600     650 79      84
## Mount Marty College                           500     500 45      55
## Grace College and Seminary                   300    1000 53      59
##                                              S.F.Ratio perc.alumni Expend
## North Central College                          16.4           33   8871
## Gordon College                                 14.2           32   9226
## Indiana University at Bloomington              21.3           24   8686
## Juniata College                                12.7           37  12067
## Niagara University                             14.2           20   7788
## Point Park College                             14.5           10   7652
## College of Saint Benedict                      13.1           26   8847
## Capital University                             12.1           27   9557
## University of Massachusetts at Dartmouth       15.0           20   7462
## Cedar Crest College                            11.7           39  10961
## Canisius College                               14.6           26   7972
## Elmira College                                 21.5           21   7502
## Longwood College                               18.4           23   5553
## New York University                            7.8           16  21227
## University of Southern Mississippi             18.7           23   5917
## Augsburg College                               12.8           31   7836
## Huron University                               12.9            4   9249
## Southwestern College                           11.8           12   7818
## College of Santa Fe                            14.0            7   8820
## Simmons College                                8.9           33  14086
## Daniel Webster College                         22.2           10   8643
## Southern California College                    18.6           11   8219
## Marywood College                               11.8           30   9034
## Maryville College                              11.1           43   8317
## Stetson University                             12.5           24  10307
## Webster University                             20.6           14   6951
## North Dakota State University                  17.0           24   6310
## Wayne State College                            20.3           29   4550
## North Park College                             13.1           24  10889
## King's College                                 15.6           37   7649
## University of Wisconsin at Madison             11.5           20  11006
## Dickinson State University                     16.5           28   4525
## Washington State University                    16.9           30  10912
## Eastern Mennonite College                      11.4           29  10188
## University of Tennessee at Knoxville           16.5           22   8612
## Mount Vernon Nazarene College                  19.8            7   6869
## University of Kansas                           13.7           17   9657
## Rowan College of New Jersey                    22.1            6   7252
```

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## Lyndon State College                              12.6     15    7114
## Hastings College                                  13.0     17    7335
## Ohio University                                    20.4     13    8811
## George Washington University                        7.6     15   14745
## St. Martin's College                               14.5      8    9209
## Western Washington University                      22.7     10    7203
## University of Wisconsin at Milwaukee               15.9      8    8094
## Capitol College                                   12.1     24    7976
## Marymount College Tarrytown                        10.3     30   10502
## Westminster College PA                             13.2     41   22704
## University of Oklahoma                             11.5     11   10244
## Texas Wesleyan University                          14.5     10    7936
## University of Puget Sound                          15.0     17   11217
## Washington College                                 11.2     37   10830
## Point Loma Nazarene College                        16.1     19    7895
## California Lutheran University                     12.4     17    8985
## Northwest Missouri State University                21.7     23    5284
## Berry College                                      16.3     17   10511
## Hope College                                       12.5     40    9284
## Bemidji State University                           19.6     16    3752
## South Dakota State University                      15.0     29    5084
## Southwestern University                            11.3     35   12995
## Fairfield University                               15.1     30   11220
## University of Cincinnati                           10.8      6   13889
## Saint Cloud State University                       18.9     10    4629
## University of Charleston                            2.5     10    7683
## Boston University                                  11.9     16   16836
## Lenoir-Rhyne College                               12.0     20    8539
## Colorado State University                          19.2     10    7850
## Creighton University                                6.5     32   22906
## George Fox College                                 13.5     22    7136
## Bethune Cookman College                            13.8      9    6817
## University of Maryland at Baltimore County         18.4      6    7618
## Georgia State University                           19.0     10    7762
## Rivier College                                     12.2     19    6744
## Colorado College                                   11.3     51   14664
## University of Utah                                 12.8      9    9275
## University of Nebraska at Lincoln                  15.1     48    6813
## Georgian Court College                             12.2     27    7348
## University of South Carolina at Columbia           16.9     18    8246
## Marist College                                     17.6     34    8408
## James Madison University                           17.9     29    5212
## Brenau University                                  13.7     12    5935
## Pacific Union College                              12.3     12    9157
## Defiance College                                   12.8     19    7505
## Husson College                                     22.0      4    4923
## Mount Saint Mary College                           15.3     23    6898
## Transylvania University                            12.1     41   10219
## Eureka College                                     10.6     31    9552
## Siena College                                      14.1     42    8189
## Pace University                                    13.8     10   10059
## College of Saint Rose                              14.3     28    6084
## Gettysburg College                                 12.1     32   14720
## Mary Washington College                            17.6     30    5358
```

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## Converse College                               10.2       31   10965
## Belmont Abbey College                           13.2       10    7550
## University of Minnesota at Duluth               19.0       11    6393
## Concordia University CA                          13.1       13    8415
## Washington University                            3.9       31   45702
## Northeast Missouri State University             15.7       13    6601
## Scripps College                                  8.2       41   18372
## University of North Carolina at Greensboro      15.5       17    7392
## University of Michigan at Ann Arbor             11.5       26   14847
## Albertson College                                9.4       11    9727
## Arizona State University Main campus            18.9        5    4602
## Hartwick College                                12.3       32   11625
## Virginia State University                       16.0       11    5733
## University of Illinois - Urbana                 17.4       13    8559
## DePauw University                               11.1       31   11525
## Linfield College                                17.8       34    8747
## College Misericordia                            12.9       23    8604
## East Carolina University                        13.2       18    9002
## Adelphi University                              12.2       16   10527
## Florida International University                13.9       20    6722
## Central Wesleyan College                        15.2       18    3365
## Worcester State College                         21.0       14    4469
## St. Bonaventure University                      17.7       32    9828
## Rutgers State University at Camden              18.6       12   10134
## Trinity College CT                              10.4       48   18034
## Morris College                                  18.6       34    6990
## Quincy University                               16.3       32    6880
## Morningside College                             13.0       32    8111
## Livingstone College                             10.4       16    9268
## Carleton College                                10.4       60   17960
## Sweet Briar College                              6.5       48   18953
## Coe College                                     12.7       32   10141
## Clemson University                              18.0       17    7597
## University of Dubuque                           16.5       18    8767
## Amherst College                                  8.4       63   21424
## Brown University                                 7.6       39   20440
## Ferrum College                                  12.5        9    7967
## Cazenovia College                               14.3       20    7697
## College of St. Scholastica                      11.6       33    8996
## Tusculum College                                21.9       28    4933
## Eastern Connecticut State University            16.9       14    5719
## Our Lady of the Lake University                 14.9       25    7114
## Harvard University                               9.9       52   37219
## Dillard University                              14.1       12    7566
## University of Arkansas at Fayetteville          14.8       10    6820
## Westminster College                             12.5       41    8596
## University of Hartford                          10.7        9   10625
## Villanova University                            13.4       24   10458
## Buena Vista College                              8.8       10    6333
## Indiana State University                        16.6        8    6996
## Southeast Missouri State University             17.1        8    5916
## Norwich University                              13.1       22    9209
## St. Norbert College                             15.1       36    8595
## Franklin College                                12.5       37   11751
```

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## Lehigh University                            12.5     43  14665
## Drew University                              10.2     28  14907
## University of Montevallo                      18.9      8   5883
## Hamilton College                              9.6     60  17761
## Oklahoma Christian University                 16.2      8   6578
## Smith College                                10.3     44  21199
## Bowling Green State University                21.1     14   6918
## Spring Arbor College                          15.4      9  10938
## Saint Joseph College                          11.2     32   8680
## Mount St. Mary's College                      11.9     19  10613
## Pacific Lutheran University                   11.0     23   9431
## Trinity College DC                             8.3     37  11806
## Westmont College                             14.9     17   8837
## Vassar College                                9.7     39  17089
## Keene State College                           16.1     13   6195
## Rocky Mountain College                        11.3     27   6422
## University of Vermont                          9.9     10  12646
## McMurry University                            11.0     11   6383
## Illinois Benedictine College                  11.6     29   8324
## University of the South                       10.3     52  18784
## University of Wisconsin-Stout                 21.0     17   6254
## Wartburg College                              12.4     37   7735
## Clarke College                                11.0     27   7963
## University of San Francisco                   13.6      8  10074
## Salem-Teikyo University                       13.0      9   8946
## Kansas Wesleyan University                    12.4     14   6535
## Augustana College IL                          12.7     40   9220
## University of Maine at Presque Isle           15.2     11   6408
## Stonehill College                             13.0     30   7495
## Manchester College                            11.8     20   7940
## Millikin University                           11.4     25   8149
## Western New England College                   15.4     15   8409
## Beaver College                                12.2     30   8954
## Stephens College                              10.9     17   9995
## Allentown Coll. of St. Francis de Sales       13.3     21   7940
## Rutgers State University at Newark            17.4     16  11878
## Christopher Newport University                21.2     16   4639
## Eckerd College                                12.8     26  15003
## Milligan College                              12.0     16   8128
## Saint Olaf College                            10.0     31  12502
## Lock Haven University of Pennsylvania         16.1     14   6374
## Lakeland College                              17.2     25   4054
## Greensboro College                            13.0     31   7949
## Central Connecticut State University          16.7      4   4900
## Hobart and William Smith Colleges             12.1     37  13040
## Wesley College                                14.4     15   6243
## Central Missouri State University             19.7      4   5501
## Rockhurst College                             10.7     21   7519
## Spelman College                               12.5     18   9988
## Bentley College                               17.5     20  10941
## Bluefield College                             17.8      3   6259
## Western Michigan University                   24.7     11   5983
## Jersey City State College                     14.9     10   8367
## Bethel College KS                              8.8     32   8324
```

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## Xavier University                          13.3    31    9189
## Drake University                           15.0    24    9473
## College of Notre Dame of Maryland          11.5    32    7477
## Belmont University                         11.1    19    7614
## Alma College                               15.3    32    9305
## Jamestown College                          17.0    21    3186
## Wabash College                              9.9    55   14904
## Virginia Union University                  13.7     8    6757
## Westminster College MO                     12.5    20    7925
## Oakland University                         19.7    13    6637
## Auburn University-Main Campus              16.7    18    6642
## Illinois State University                  21.0    16    5569
## Wentworth Institute of Technology          15.4     8   17858
## Goshen College                              9.9    46   10270
## Johnson State College                      14.4    15    6564
## York College of Pennsylvania              18.1    28    4509
## Southwest Missouri State University        19.9    11    4632
## Butler University                          10.9    29    9511
## Lawrence University                        10.1    57   13965
## University of Richmond                     11.7    32   11984
## Hood College                               14.4    34   12434
## Brigham Young University at Provo           20.5    40    7916
## Rosary College                             12.9    30    9264
## Campbell University                        21.8    34    3739
## Wingate College                            13.9     8    7264
## Rhodes College                             10.8    47   13388
## St. John Fisher College                    14.5    29    7908
## University of Scranton                     14.1    41    9131
## Franklin Pierce College                    17.6    16    6418
## Marshall University                        16.6    10    6203
## Mankato State University                   19.0    11    5801
## University of Oregon                       19.7    13    8020
## College of Notre Dame                      10.4     7    9773
## Kentucky Wesleyan College                  11.3    32    7058
## Lycoming College                           14.0    32    8024
## Cumberland College                         13.0     4    8189
## Manhattanville College                     11.3    24   11291
## Seton Hall University                      14.4    15   10080
## Lynchburg College                          12.4    24    8832
## Union College NY                           11.5    49   15411
## University of Illinois at Chicago          10.0     6   13883
## Christian Brothers University              11.1    24    8129
## University of Miami                         5.9    17   17500
## Saint Mary's College of Minnesota          18.8    19    5081
## Marymount University                       10.6    17    8575
## Wesleyan University                        12.1    39   16262
## University of Sci. and Arts of Oklahoma    23.6     3    3864
## Immaculata College                         11.2    33    7305
## Fordham University                         14.4    14   10864
## Mount Union College                        16.7    35    7215
## Geneva College                             20.1    26    6786
## Williams College                            9.0    64   22014
## Averett College                            22.4    11    6523
## Northwest Nazarene College                 14.8    20    6261
```

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## Virginia Wesleyan College                        15.7       14    7804
## University of Connecticut at Storrs               16.0       16   10178
## University of Virginia                             9.5       22   13597
## Freed-Hardeman University                         16.1       13    6078
## Baker University                                  11.0       21    6136
## Lewis University                                  14.3       10    7701
## Moorhead State University                         18.1       19    4795
## Saint Francis College                             19.3       24    7344
## University of Maine at Machias                    15.1        4    5935
## Bennington College                                10.1       33   16364
## Guilford College                                  15.6       30    9114
## Bethel College                                    11.7       13    7623
## Westfield State College                           15.7       20    4222
## Southern Illinois University at Edwardsville       16.5        8    7498
## Dowling College                                   12.4        7   11178
## Marian College of Fond du Lac                      8.4       21    5352
## Sioux Falls College                               14.8        7    7881
## Monmouth College IL                               11.6       43   11087
## Saint Mary-of-the-Woods College                   10.2       37    9678
## Upper Iowa University                             17.4       19    3733
## Voorhees College                                  22.9        3    5861
## Pacific University                                10.9       22   11216
## Willamette University                             13.3       37   10779
## Siena Heights College                              7.2       17    9431
## St. Thomas Aquinas College                        16.1       13    6534
## Washington and Lee University                      9.6       45   15736
## Alverno College                                   11.1       26    8127
## Claflin College                                   16.9       31    7083
## University of Maine at Farmington                 15.9       26    5712
## Ramapo College of New Jersey                      17.8        8    7333
## Central College                                   13.5       29    8444
## Ursuline College                                  10.5       15    7164
## Hardin-Simmons University                         13.7       10    7054
## Fontbonne College                                 21.5       24    4607
## University of California at Irvine                16.1       11   15934
## Keuka College                                     13.3       43    7863
## Beloit College                                    11.1       26   12957
## Baylor University                                 18.5       38    7503
## University of Detroit Mercy                       13.5       14   10891
## Samford University                                14.7       17    9533
## Southwestern Adventist College                    13.0       12    5309
## Saint Xavier University                           13.7       15    8953
## Harvey Mudd College                                8.2       46   21569
## Virginia Commonwealth University                   8.7       11   11183
## Arkansas Tech University                          19.6        5    4739
## New Mexico Institute of Mining and Tech.          13.7       11    9241
## Pennsylvania State Univ. Main Campus              18.1       19    8992
## Meredith College                                  13.9       33    6881
## SUNY College  at Oswego                           22.0       21    5280
## University of New England                         11.4       13    9718
## Wells College                                      8.3       42   13935
## Allegheny College                                  9.9       41   11711
## McPherson College                                  9.8       45    9754
## Trinity College VT                                10.4       26    9586
```

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## Bridgewater College                              13.2       24    8655
## Saint Vincent College                             12.3       31    8534
## Blackburn College                                 14.3       53    8377
## University of Mississippi                          20.3       14    6971
## Sacred Heart University                            14.8       16    7120
## Johns Hopkins University                            3.3       38   56233
## Clinch Valley Coll. of  the Univ. of Virginia      18.1        9    4417
## College of Saint Catherine                         11.5       32    7315
## Culver-Stockton College                            14.1       28    5807
## Carroll College                                    17.8       25    7666
## Cedarville College                                 15.3       34    6897
## Concordia College at St. Paul                      12.8       18    6955
## Philadelphia Coll. of Textiles and Sci.            12.9       15    8028
## Manhattan College                                  13.6       25   10062
## Hiram College                                      10.6       34   12165
## Mississippi University for Women                   15.8        8    5704
## Yale University                                     5.8       49   40386
## Valparaiso University                              14.2       23    9681
## Barat College                                       9.7       35    9337
## Hollins College                                    11.1       48   13957
## Tulane University                                   9.1       21   16920
## Waynesburg College                                 16.2       26    6563
## Cornell College                                    12.2       31   10340
## Centenary College                                   9.5       20    9583
## Texas Lutheran College                             13.8       24    7002
## West Virginia Wesleyan College                     16.4       42    8080
## Nazareth College of Rochester                      13.6       24    8797
## University of Pittsburgh-Main Campus                7.8       10   13789
## Saint Francis College IN                           12.5        4    7440
## East Tennessee State University                    14.0        9    9825
## Baldwin-Wallace College                            17.6       20    8086
## University of West Florida                         23.4       12    8488
## Colgate University                                 10.5       45   15494
## Wake Forest University                              4.3       37   41766
## Loyola Marymount University                        14.2       10   11677
## SUNY College at Buffalo                            18.7       12    7511
## Montclair State University                         21.5        9    6717
## University of Delaware                             18.3       15   10650
## Marquette University                               13.5       25    9982
## William Woods University                           12.9       16    7438
## University of South Carolina at Aiken              14.8        3    5035
## Fresno Pacific College                             10.5       14    8095
## Saint Joseph's University                          17.4       13    8243
## West Chester University of Penn.                   15.3       16    6773
## Emory University                                    5.0       28   28457
## Texas Southern University                          18.2       21    3605
## Saint Joseph's College                             27.2        8    4322
## Loyola University Chicago                           6.2       15   13009
## Whitman College                                    10.5       51   13198
## Southwest State University                         16.5       31    6591
## Roger Williams University                          16.4        8    7957
## Ohio Wesleyan University                           12.1       32   12011
## Houghton College                                   15.0       24    8187
## Green Mountain College                             14.0       24    6475
```

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## Wellesley College                              10.6    51  21409
## Saint Ambrose University                        14.1    16   7444
## Huntington College                              11.8    25   9466
## Barry University                                12.6    11   9084
## Wheeling Jesuit College                         14.1    27   7494
## Eastern College                                 13.6    22   8135
## Whitworth College                               16.9    20   8328
## Fayetteville State University                   15.1    10   6972
## Western State College of Colorado               19.4     4   4599
## Skidmore College                                12.7    29  14837
## California State University at Fresno            21.2     8   7268
## Rensselaer Polytechnic Institute                15.4    21  15605
## Saint Anselm College                            14.5    29   6719
## Adrian College                                  12.9    30   8735
## University of North Carolina at Charlotte       16.8     7   6227
## Wheaton College IL                              12.7    40  11916
## Louisiana Tech University                       20.0    13   4546
## Bellarmine College                              13.1    31   6668
## Loyola College                                  14.7    27   9448
## Polytechnic University                          10.4    14  14329
## University of Southern California               11.4    10  17007
## University of Mobile                            16.6     4   5412
## John Brown University                           13.3    19   8118
## SUNY College at Geneseo                         19.1    25   5716
## Mount Marty College                             11.7    38   5073
## Grace College and Seminary                      15.3    26   9798
##                                           Grad.Rate
## North Central College                            76
## Gordon College                                   66
## Indiana University at Bloomington                68
## Juniata College                                  80
## Niagara University                               65
## Point Park College                               66
## College of Saint Benedict                        72
## Capital University                               83
## University of Massachusetts at Dartmouth         56
## Cedar Crest College                              74
## Canisius College                                 64
## Elmira College                                   64
## Longwood College                                 62
## New York University                              71
## University of Southern Mississippi               45
## Augsburg College                                 58
## Huron University                                 21
## Southwestern College                             52
## College of Santa Fe                              80
## Simmons College                                  79
## Daniel Webster College                           72
## Southern California College                      43
## Marywood College                                 66
## Maryville College                                51
## Stetson University                               73
## Webster University                               48
## North Dakota State University                    42
```

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## Wayne State College                                   52
## North Park College                                    74
## King's College                                        87
## University of Wisconsin at Madison                    72
## Dickinson State University                            46
## Washington State University                           56
## Eastern Mennonite College                             82
## University of Tennessee at Knoxville                  53
## Mount Vernon Nazarene College                         58
## University of Kansas                                  57
## Rowan College of New Jersey                           51
## Lyndon State College                                  51
## Hastings College                                      52
## Ohio University                                       64
## George Washington University                          72
## St. Martin's College                                  40
## Western Washington University                         61
## University of Wisconsin at Milwaukee                  38
## Capitol College                                       52
## Marymount College Tarrytown                           77
## Westminster College PA                                71
## University of Oklahoma                                44
## Texas Wesleyan University                             43
## University of Puget Sound                             63
## Washington College                                    65
## Point Loma Nazarene College                           54
## California Lutheran University                        60
## Northwest Missouri State University                   54
## Berry College                                         63
## Hope College                                          72
## Bemidji State University                              46
## South Dakota State University                         67
## Southwestern University                               67
## Fairfield University                                  94
## University of Cincinnati                              54
## Saint Cloud State University                          58
## University of Charleston                              57
## Boston University                                     72
## Lenoir-Rhyne College                                  66
## Colorado State University                             59
## Creighton University                                  85
## George Fox College                                    52
## Bethune Cookman College                               58
## University of Maryland at Baltimore County            55
## Georgia State University                              34
## Rivier College                                        81
## Colorado College                                      84
## University of Utah                                    37
## University of Nebraska at Lincoln                     53
## Georgian Court College                                76
## University of South Carolina at Columbia              63
## Marist College                                        69
## James Madison University                              98
## Brenau University                                     49
```

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## Pacific Union College                            69
## Defiance College                                 56
## Husson College                                   84
## Mount Saint Mary College                         88
## Transylvania University                          70
## Eureka College                                   53
## Siena College                                   100
## Pace University                                  62
## College of Saint Rose                            64
## Gettysburg College                               83
## Mary Washington College                          84
## Converse College                                 75
## Belmont Abbey College                            52
## University of Minnesota at Duluth                53
## Concordia University CA                           55
## Washington University                            90
## Northeast Missouri State University              76
## Scripps College                                  73
## University of North Carolina at Greensboro       53
## University of Michigan at Ann Arbor              87
## Albertson College                                55
## Arizona State University Main campus             48
## Hartwick College                                 73
## Virginia State University                        31
## University of Illinois - Urbana                  81
## DePauw University                                82
## Linfield College                                 81
## College Misericordia                             96
## East Carolina University                         58
## Adelphi University                               56
## Florida International University                 66
## Central Wesleyan College                         58
## Worcester State College                          40
## St. Bonaventure University                       78
## Rutgers State University at Camden               57
## Trinity College CT                               91
## Morris College                                   60
## Quincy University                                80
## Morningside College                              56
## Livingstone College                              92
## Carleton College                                 91
## Sweet Briar College                              61
## Coe College                                      67
## Clemson University                               73
## University of Dubuque                            45
## Amherst College                                 100
## Brown University                                 97
## Ferrum College                                   22
## Cazenovia College                               118
## College of St. Scholastica                      72
## Tusculum College                                 52
## Eastern Connecticut State University            50
## Our Lady of the Lake University                 37
## Harvard University                              100
```

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## Dillard University                            61
## University of Arkansas at Fayetteville         39
## Westminster College                            80
## University of Hartford                          66
## Villanova University                            96
## Buena Vista College                             78
## Indiana State University                        40
## Southeast Missouri State University             45
## Norwich University                              63
## St. Norbert College                             88
## Franklin College                               60
## Lehigh University                               91
## Drew University                                83
## University of Montevallo                        51
## Hamilton College                                91
## Oklahoma Christian University                   45
## Smith College                                  90
## Bowling Green State University                  67
## Spring Arbor College                            49
## Saint Joseph College                            76
## Mount St. Mary's College                        72
## Pacific Lutheran University                     83
## Trinity College DC                              96
## Westmont College                                87
## Vassar College                                 90
## Keene State College                             61
## Rocky Mountain College                          68
## University of Vermont                           79
## McMurry University                              32
## Illinois Benedictine College                    75
## University of the South                         82
## University of Wisconsin-Stout                   65
## Wartburg College                                67
## Clarke College                                 74
## University of San Francisco                     62
## Salem-Teikyo University                         98
## Kansas Wesleyan University                      68
## Augustana College IL                            71
## University of Maine at Presque Isle             35
## Stonehill College                               97
## Manchester College                              64
## Millikin University                             75
## Western New England College                     59
## Beaver College                                  73
## Stephens College                                59
## Allentown Coll. of St. Francis de Sales         74
## Rutgers State University at Newark              58
## Christopher Newport University                  48
## Eckerd College                                  59
## Milligan College                                64
## Saint Olaf College                              83
## Lock Haven University of Pennsylvania           63
## Lakeland College                                57
## Greensboro College                              39
```

```
## Central Connecticut State University            49
## Hobart and William Smith Colleges               79
## Wesley College                                  84
## Central Missouri State University               50
## Rockhurst College                               79
## Spelman College                                 65
## Bentley College                                 82
## Bluefield College                               53
## Western Michigan University                     55
## Jersey City State College                       26
## Bethel College KS                               56
## Xavier University                               83
## Drake University                                77
## College of Notre Dame of Maryland              75
## Belmont University                              49
## Alma College                                   68
## Jamestown College                              54
## Wabash College                                 72
## Virginia Union University                       30
## Westminster College MO                          62
## Oakland University                             53
## Auburn University-Main Campus                   69
## Illinois State University                      54
## Wentworth Institute of Technology              64
## Goshen College                                 72
## Johnson State College                          36
## York College of Pennsylvania                   99
## Southwest Missouri State University             56
## Butler University                              83
## Lawrence University                            77
## University of Richmond                         100
## Hood College                                   72
## Brigham Young University at Provo               33
## Rosary College                                 81
## Campbell University                            63
## Wingate College                                91
## Rhodes College                                 77
## St. John Fisher College                        66
## University of Scranton                         92
## Franklin Pierce College                        51
## Marshall University                            50
## Mankato State University                       68
## University of Oregon                           54
## College of Notre Dame                          43
## Kentucky Wesleyan College                      62
## Lycoming College                               72
## Cumberland College                             63
## Manhattanville College                         70
## Seton Hall University                          64
## Lynchburg College                              70
## Union College NY                               88
## University of Illinois at Chicago              34
## Christian Brothers University                  63
## University of Miami                            59
```

```
## Saint Mary's College of Minnesota                78
## Marymount University                              55
## Wesleyan University                               92
## University of Sci. and Arts of Oklahoma           43
## Immaculata College                                69
## Fordham University                                80
## Mount Union College                               81
## Geneva College                                    74
## Williams College                                  99
## Averett College                                   48
## Northwest Nazarene College                        58
## Virginia Wesleyan College                         68
## University of Connecticut at Storrs               71
## University of Virginia                            95
## Freed-Hardeman University                         62
## Baker University                                  65
## Lewis University                                  61
## Moorhead State University                         60
## Saint Francis College                             69
## University of Maine at Machias                    64
## Bennington College                                55
## Guilford College                                  65
## Bethel College                                    35
## Westfield State College                           65
## Southern Illinois University at Edwardsville      43
## Dowling College                                   42
## Marian College of Fond du Lac                     59
## Sioux Falls College                               48
## Monmouth College IL                               56
## Saint Mary-of-the-Woods College                  75
## Upper Iowa University                             78
## Voorhees College                                  58
## Pacific University                                42
## Willamette University                             68
## Siena Heights College                             47
## St. Thomas Aquinas College                        67
## Washington and Lee University                     90
## Alverno College                                   55
## Claflin College                                   21
## University of Maine at Farmington                 59
## Ramapo College of New Jersey                      47
## Central College                                   67
## Ursuline College                                  68
## Hardin-Simmons University                         38
## Fontbonne College                                 62
## University of California at Irvine                66
## Keuka College                                     51
## Beloit College                                    69
## Baylor University                                 72
## University of Detroit Mercy                       51
## Samford University                                61
## Southwestern Adventist College                    36
## Saint Xavier University                           55
## Harvey Mudd College                              100
```

```
## Virginia Commonwealth University                    45
## Arkansas Tech University                            48
## New Mexico Institute of Mining and Tech.            34
## Pennsylvania State Univ. Main Campus                63
## Meredith College                                    82
## SUNY College  at Oswego                             63
## University of New England                           64
## Wells College                                       69
## Allegheny College                                   76
## McPherson College                                   48
## Trinity College VT                                  78
## Bridgewater College                                 82
## Saint Vincent College                               88
## Blackburn College                                   51
## University of Mississippi                           53
## Sacred Heart University                             82
## Johns Hopkins University                            90
## Clinch Valley Coll. of  the Univ. of Virginia       46
## College of Saint Catherine                          77
## Culver-Stockton College                             51
## Carroll College                                     79
## Cedarville College                                  64
## Concordia College at St. Paul                       45
## Philadelphia Coll. of Textiles and Sci.             68
## Manhattan College                                   79
## Hiram College                                       79
## Mississippi University for Women                    63
## Yale University                                     99
## Valparaiso University                               95
## Barat College                                       71
## Hollins College                                     72
## Tulane University                                   74
## Waynesburg College                                  63
## Cornell College                                     64
## Centenary College                                   24
## Texas Lutheran College                              50
## West Virginia Wesleyan College                      67
## Nazareth College of Rochester                       61
## University of Pittsburgh-Main Campus                66
## Saint Francis College IN                            48
## East Tennessee State University                     42
## Baldwin-Wallace College                             85
## University of West Florida                          53
## Colgate University                                  93
## Wake Forest University                              89
## Loyola Marymount University                         84
## SUNY College at Buffalo                             42
## Montclair State University                          58
## University of Delaware                              75
## Marquette University                                77
## William Woods University                            52
## University of South Carolina at Aiken               48
## Fresno Pacific College                              54
## Saint Joseph's University                           83
```

```
## West Chester University of Penn.                       52
## Emory University                                        96
## Texas Southern University                               10
## Saint Joseph's College                                  85
## Loyola University Chicago                               65
## Whitman College                                         72
## Southwest State University                              51
## Roger Williams University                               61
## Ohio Wesleyan University                                75
## Houghton College                                        67
## Green Mountain College                                  76
## Wellesley College                                       91
## Saint Ambrose University                                70
## Huntington College                                      47
## Barry University                                        72
## Wheeling Jesuit College                                 72
## Eastern College                                         54
## Whitworth College                                       80
## Fayetteville State University                           24
## Western State College of Colorado                       52
## Skidmore College                                        81
## California State University at Fresno                    61
## Rensselaer Polytechnic Institute                         70
## Saint Anselm College                                    97
## Adrian College                                          54
## University of North Carolina at Charlotte               62
## Wheaton College IL                                      85
## Louisiana Tech University                               45
## Bellarmine College                                      84
## Loyola College                                          80
## Polytechnic University                                  62
## University of Southern California                       68
## University of Mobile                                    52
## John Brown University                                   75
## SUNY College at Geneseo                                 76
## Mount Marty College                                     44
## Grace College and Seminary                              64
```

(b) Fit a linear model using least squares on the training set, and report the test error obtained.

```r
# Fitting a linear model

lm.fit <- lm(Apps ~ ., data = train)

# Predicting the values

lm.pred <- predict(lm.fit, test)

lm.mse <- mean((lm.pred - test$Apps)^2)

lm.mse
```

```
## [1] 1527482
```