An evaluation of teaching evaluations: What do the numbers mean?

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Abstract

Student evaluation of teaching helps determine faculty merit ratings. A multinomial-choice, ordered data model is used to identify factors having high statistical relevance with respect to value of the course and quality of instruction. Some results agree with findings from outside Agriculture, but there are interesting exceptions.

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At most Land Grant universities, student evaluation of resident instruction plays a role in determining faculty merit ratings and subsequent pay raises. However, anecdotal evidence suggests that there is a tendency for departmental and college administrators to base merit ratings on the mean value of responses to evaluation questions concerning the student's perception of course value and quality of instruction. Specifically, if the rating for quality of instruction increases from one year to the next then that faculty is seen as having improved instruction and is rewarded in terms of a higher merit rating. While most administrators have a "rule of thumb" relative to good versus bad overall teaching rating, faculty often observe fluctuations in ones teaching rating as capricious and of little statistical merit.

The extant literature is rich in studies concerning how best to interpret the results of teaching evaluations and studies concerning the validity of teaching evaluations in general. Yet few, if any of these studies, have focused on instruction in the college of agriculture. Again, anecdotal observations from across the US suggest that colleges of agriculture insist on having regular faculty in classes, prefer smaller class sizes, and, in general, make taking care of students an administrative priority. Thus, colleges of agriculture are unique in university settings with respect to resident instruction and blind application of study results from other colleges/programs might be misleading.

Of particular interest of some instructors at the University of Kentucky is the impact that "external factors" have on a students rating of the value of a class and quality of instruction. What the extant literature reveals (i.e., larger classes reduce ones teaching rating, required classes reduce ones teaching rating, etc.) is assumed to be true of evaluation of College of Agriculture courses. Yet, it is not known if these conjectures are true. Furthermore, "external factors" not considered in the extant literature like GPA of the class, when and where the class meets, and how often the class meets are thought to influence course evaluation.

The purpose of this research is to identify those factors that have the highest statistical relevance with respect to evaluation of faculty instruction within the College of Agriculture at the University of Kentucky (UK). The College administration focuses on two evaluation questions: 1. UK Standard Course Evaluation Form Question 20 (Q20): Overall value of the course; and 2. UK Standard Course Evaluation Form Question 21 (Q21): Overall quality of teaching. Thus, using regression estimation, this investigation statistically tests if required classes, class GPA, when the class meets during the week, time of day that the class meets, and location of the class room impacts the rating that instructors receive on Q20 and Q21.

Theoretical Model and Data

Like most university teaching evaluations, students at the University of Kentucky are asked to respond to a question by penciling in the appropriate "bubble" on a form that will be optically scanned and electronically recorded. For most questions students are asked to indicate if they strongly disagree, disagree, agree, or strongly agree with the stated question. In the case of Q20, "Overall value of the course," and Q21, "Overall quality of teaching," the options are poor, fair, good, or excellent.

For evaluation questions 20 and 21, each option is binomial in that you select that option or you do not. Yet each question is also multinomial in that you select one of four options. Furthermore, the multinomial choice variable is also ordered. In the case of ordered, discrete data the appropriate estimation procedure is ordered logit or ordered probit (Greene, 1990). Specifically, linear regression (OLS) would treat the difference between responses of "poor" and "fair" the same as the difference between responses of "good" and "excellent." Multinomial logit or probit, one the other hand, would fail to account for the ordinal nature of the questions 20 and 21.

Following Greene (1990), the ordered probit model is built around a latent regression. Given that questions 20 and 21 ask students to choose 1 or 4 options, the following discussion assumes 4 levels. Equation 1 expresses the latent regression where y^* is unobserved, but is know to assume the value of 1 (for poor), 2 (for fair), 3 (for good), and 4 (for excellent) for specific intervals.

Equation 1.

$$
\begin{aligned}
&y^* = X\beta + \varepsilon \\
&\textit{Where} \\
&y = 1 \quad \text{if } y^* \le 0, \\
&y = 2 \quad \text{if } 0 \le y^* < \lambda_1, \\
&y = 3 \quad \text{if } \lambda_1 \le y^* < \lambda_2, \\
&y = 4 \quad \text{if } \lambda_2 \le y^*.
\end{aligned}
$$

The matrix X contains the independent variables thought to determine one's choice of y^* and β is a column vector of estimated parameter values. The intervals in Equation 1 act to censor the outcome. The λ's are unknown parameters (called threshold parameters) that are estimated with the parameters in β. In the case of 4 outcomes, 3 threshold parameters (λ_1, λ_2, and λ_3) are estimated.

Still following Greene (1990), it is assumed that the disturbance term (ε) is normally distributed with a mean of 0 and a variance of 1. Normalizing ε allows expression of the 4 outcomes as probabilities (Equation 2). Note that a switch in notion occurred between Equations 1 and 2. In Equation 2 the β'**x** term denotes the sum of mean values for the variables in X (held in a column vector **x**) multiplied by their respective estimated parameter value held in β. Thus, the probabilities in Equation 3 (and the marginal values in Equation 4) are determined only after estimating the parameters in β and calculating the mean values held in **x**. Estimating probabilities and marginal values at the mean of the independent variables is standard procedure.

Equation 2.

$$\Pr ob[y=0] = \Phi(-\beta' x) = \frac{e^{-\beta' x}}{1+e^{-\beta' x}}$$
$$\Pr ob[y=1] = \Phi(\lambda_1 - \beta' x) - \Phi(-\beta' x)$$
$$\Pr ob[y=2] = \Phi(\lambda_2 - \beta' x) - \Phi(\lambda_1 - \beta' x)$$
$$\Pr ob[y=3] = 1 - \Phi(\lambda_2 - \beta' x)$$
$$Where\ \beta' x \cong b_0 + \sum_{i=1}^{k} b_i \overline{X}_i$$

In OLS, the parameter estimates (β's) specify the change in the dependent variable that results from a one unit change in the independent variable of concern. This is not the case with ordered probit analysis. Increasing one of the **x**'s while holding β and λ constant is equivalent to shifting the normal probability distribution. The effect of the shift in the middle portion of the distribution (for Prob[y=1] and Prob[y=2]) is ambiguous. Generally, (for continuous variables) only the signs of the changes in Prob[y=0] and Prob[y=4] (the ends of the spectrum) are unambiguous. For example, if the β_i for $\mathbf{x}_i$ is positive, then Prob[y=0] must decline and Prob[y=j] (where j=4 in this case; the other end of the order) must increase. Unfortunately, the ordered probit model is difficult to interpret. Equations 3 and 4 express the appropriate marginal (or slope) functions for the case where the independent variable is continuous (Equation 3) or dichotomous (Equation 4). Note that the marginal effects for the different levels should sum to zero. This follows from the requirement that the probabilities (Equation 2) for the different levels sum to 1 (Greene, 1990).

Equation 3.

$$\frac{\partial \Pr ob[y=0]}{\partial x_i} = -\phi(-\beta' x)\beta_i = -\left[\frac{e^{-\beta' x}}{\left(1+e^{\beta' x}\right)^2}\right]\beta_i$$
$$\frac{\partial \Pr ob[y=1]}{\partial x_i} = [\phi(-\beta' x) - \phi(\lambda_1 - \beta' x)]\beta_i$$
$$\frac{\partial \Pr ob[y=2]}{\partial x_i} = [\phi(\lambda_1 - \beta' x) - \phi(\lambda_2 - \beta' x)]\beta_i$$
$$\frac{\partial \Pr ob[y=3]}{\partial x_i} = \phi(\lambda_2 - \beta' x)\beta_i$$

The data used in this investigation was obtained from the UK Office of Institutional Research (www.uky.edu/IR/). Individual student records for all UK College of Agriculture classes (where course evaluations were conducted) from Fall semester 1997 to Fall semester 2002 (excluding summer classes) are included in the data set

(11 Semesters; 27,048 individual records/observations). Note that not all classes in the College of Agriculture are required to conduct class evaluations. Furthermore, UK's college of Agriculture offers few summer courses.

Equation 4.

$$\frac{\partial \Pr ob[y=0]}{\partial x_i} = \Pr ob[y=0 \setminus \beta' x \text{ where } x_i = 0] - \Pr ob[y=0 \setminus \beta' x \text{ where } x_i = 1]$$
$$\frac{\partial \Pr ob[y=1]}{\partial x_i} = \Pr ob[y=1 \setminus \beta' x \text{ where } x_i = 0] - \Pr ob[y=1 \setminus \beta' x \text{ where } x_i = 1]$$
$$\frac{\partial \Pr ob[y=2]}{\partial x_i} = \Pr ob[y=2 \setminus \beta' x \text{ where } x_i = 0] - \Pr ob[y=2 \setminus \beta' x \text{ where } x_i = 1]$$
$$\frac{\partial \Pr ob[y=3]}{\partial x_i} = \Pr ob[y=3 \setminus \beta' x \text{ where } x_i = 0] - \Pr ob[y=3 \setminus \beta' x \text{ where } x_i = 1]$$

Table 1 reports the 19 questions asked in Sections B, C, D, and E of UK's standard course evaluation form. If the class is required by UK's University Studies Program or the course includes a lab, additional questions are asked. However, these questions are not included in this study (or in Table 1). In addition to instructor and course name, the standard course evaluation form elicits information on class standing, expected grade, reason for taking the course, and hours spent weekly studying for the class. Gender and race demographics are not provided. Finally, the Office of Institutional Research provides information concerning the size of the class, the type of instructor (regular, full time faculty, graduate teaching assistant, etc.), and the type of class (i.e., lecture versus lab).

Secondary class information was collected to augment the data provided by the standard course evaluation form. Program brochures were reviewed to determine what classes in each program are required of all students in the program. This process eliminated problems associated with self reporting. Many students mark a class as required if advised to take the class even if it is not a required class according to university guidelines. Information was also collected on what days of the week the class met, the grade point average for the class measured at the end of the semester, the time of day that the class met, and the location of the room in which the class met.

Results

UK's Standard Course Evaluation Form is designed so that questions 1 through 19 (Q01 through Q19; Table 1) can be used to explain the dependent variables Q20 "Overall value of the course" and Q21 "Overall quality of teaching." It is Q20 and Q21 that is the focus of the Standard Course Evaluation Form. However, the form is also designed so that the variables listed in each section of the form contribute to a composite understanding of the group. For example, in Table 1, questions 9 through 14 all relate to the performance of the instructor, thus the group name "Instructor Items." As a consequence, the questions included in each group were anticipated to be collinear in terms of contributing to our understanding of Q20 and Q21. Using factor analysis in SAS it was determined that the questions did group as designed. Factor analysis provides two solutions to the multicollinearity problem: 1) design a group variable using a process similar to principal components; or 2) identify the variable in the group with the highest rotated factor pattern and use this variable to represent the variables of the group. For this investigation the second option is utilized. Specifically, Question 7 (Q07) “Graded assignments returned promptly” represents the group “Course Items,” Q10 “Had good knowledge of the subject matter” represents the group “Instructor Items,” and Q17 “Course helped ability to solve problems” represents the group “Learning Outcomes.”

Most of the independent variables describe above are categorical. As such, they are best utilized in regression analysis where each category is treated as a separate dummy (dichotomous) variable. Unfortunately this process results in numerous dummy variables that complicate the analysis (especially where using ordered probit to estimate the latent variable). However, estimating all levels in a single variable is inappropriate because doing so in beds the hypothesis that the difference between each level is equal.

Given appropriate adjustments for multicollinearity and definition of dummy variables, Equation 5 was estimated using Proc Probit in SAS (using the formatted order option). The model includes 75 parameters and variable definitions extend over the next several pages. However, note that the variables are grouped by category and that evaluation will focus on group outcomes. Also note that the dependent variable of Equation 5 is Q20. Separate models were estimated for Q20 and Q21, but the models were identical with the exception of the dependent variable.

Equation 5.

$$
\begin{aligned}
\text{Q20}_i = b_0 + {} & b_1\,\text{Q07}_i + b_2\,\text{Q10}_i + b_3\,\text{Q17}_i + b_4\,\text{c\_fr}_i + b_5\,\text{c\_so}_i + \\
& b_6\,\text{c\_jr}_i + b_7\,\text{c\_sr}_i + b_8\,\text{c\_gd}_i + b_9\,\text{usp}_i + b_{10}\,\text{aec}_i + \\
& b_{11}\,\text{agr}_i + b_{12}\,\text{asc}_i + b_{13}\,\text{bae}_i + b_{14}\,\text{cld}_i + b_{15}\,\text{ent}_i + \\
& b_{16}\,\text{for}_i + b_{17}\,\text{hor}_i + b_{18}\,\text{la}_i + b_{19}\,\text{abt}_i + b_{20}\,\text{gen}_i + \\
& b_{21}\,\text{nrc}_i + b_{22}\,\text{pls}_i + b_{23}\,\text{ecga}_i + b_{24}\,\text{ecgb}_i + b_{25}\,\text{ecgc}_i + \\
& b_{26}\,\text{ecgd}_i + b_{27}\,\text{class}_i + b_{28}\,\text{fac}_i + b_{29}\,\text{gta}_i + b_{30}\,\text{11\_20}_i + \\
& b_{31}\,\text{11\_20}_i + b_{32}\,\text{21\_30}_i + b_{33}\,\text{31\_40}_i + b_{34}\,\text{41\_50}_i + b_{35}\,\text{51\_60}_i + \\
& b_{36}\,\text{gt\_60}_i + b_{37}\,\text{s4\_6}_i + b_{38}\,\text{s7\_10}_i + b_{39}\,\text{sgt10}_i + b_{40}\,\text{c100}_i + \\
& b_{41}\,\text{c300}_i + b_{42}\,\text{c400}_i + b_{43}\,\text{c500}_i + b_{44}\,\text{c100r}_i + b_{45}\,\text{c200r}_i + \\
& b_{46}\,\text{c300r}_i + b_{47}\,\text{c400r}_i + b_{48}\,\text{s98}_i + b_{49}\,\text{f98}_i + b_{50}\,\text{s99}_i + \\
& b_{51}\,\text{f99}_i + b_{52}\,\text{s00}_i + b_{53}\,\text{f00}_i + b_{54}\,\text{s01}_i + b_{55}\,\text{f01}_i + \\
& b_{56}\,\text{s02}_i + b_{57}\,\text{f02}_i + b_{58}\,\text{mwf}_i + b_{59}\,\text{tr}_i + b_{60}\,\text{odw}_i + \\
& b_{61}\,\text{twd}_i + b_{62}\,\text{gpa}_i + b_{63}\,\text{1012}_i + b_{64}\,\text{1202}_i + b_{65}\,\text{0204}_i + \\
& b_{66}\,\text{gt04}_i + b_{67}\,\text{as\_ann}_i + b_{68}\,\text{as\_n}_i + b_{69}\,\text{as\_s}_i + b_{70}\,\text{b52}_i + \\
& b_{71}\,\text{cb}_i + b_{72}\,\text{ceb1f}_i + b_{73}\,\text{ceb2f}_i + b_{74}\,\text{gar89}_i + b_{75}\,\text{tpc}_i
\end{aligned}
$$

Where For the dependent variables

Q20	Overall value of the course
Q21	Overall quality of teaching

For the course evaluation independent (continuous) variables

Q07	Represents the Course Items Group
Q10	Represents the Instructor Items Group
Q17	Represents the Learning Outcomes Group

For the class standing independent (dichotomous) variables

c_fr	Student reports self as a Freshman
c_so	Student reports self as a Sophomore
c_jr	Student reports self as a Junior
c_sr	Student reports self as a Senior
c_gd	Student reports self as a Graduate Student

If a member of the group then <variable> = 1; 0 otherwise.

For the academic program independent (dichotomous) variables

usp	Class being taken as part of the University Studies Program
aec	Class offered by Agricultural Economics
agr	Class offered by Agronomy
asc	Class offered by Animal Science
bae	Class offered by Bio-systems and Agricultural Engineering
cld	Class offered by Community and Leadership Development
ent	Class offered by Entomology
for	Class offered by Forestry
hor	Class offered by Horticulture
la	Class offered by Landscape Architecture
abt	Class offered by the Agriculture Biotechnology Program
gen	Class offered as part of the General Agriculture Series
nrc	Class offered by the Natural Resources Conservation Management Program
pls	Class offered by the Plant and Soil Sciences faculty of Agronomy

If a member of the group then <variable> = 1; 0 otherwise.

For the general class and instructor type (dichotomous) variables

class	Class is a lecture format versus a laboratory
fac	Class is instructed by regular appointment faculty member
gta	Class is instructed by a Graduate Teaching Assistant

If a member of the group then <variable> = 1; 0 otherwise.

For the class size (dichotomous) variables

11_20	Class size is 11 to 20 students
21_30	Class size is 21 to 30 students
31_40	Class size is 31 to 40 students
41_50	Class size is 41 to 50 students
51_60	Class size is 51 to 60 students
gt_60	Class size is over 60 students

If a member of the group then <variable> = 1; 0 otherwise.

For the hours studied (dichotomous) variables

s4_6	Student reports studying 4 to 6 hours weekly
s7_10	Student reports studying 7 to 10 hours weekly
sgt10	Student reports studying over 10 hours weekly

If a member of the group then <variable> = 1; 0 otherwise.

For the required class and course level (dichotomous) variables

c100 Class is course listed at the 100 level
c300 Class is course listed at the 100 level
c400 Class is course listed at the 100 level
c500 Class is course listed at the 100 level
c100r Class is course listed at the 100 level and is required for, at least, one of the academic programs listed above.
c200r Class is course listed at the 100 level and is required for, at least, one of the academic programs listed above.
c300r Class is course listed at the 100 level and is required for, at least, one of the academic programs listed above.
c400r Class is course listed at the 100 level and is required for, at least, one of the academic programs listed above.

If a member of the group then <variable> = 1; 0 otherwise.

For the semester offered (dichotomous) variables

s98 Spring semester 1998
f98 Fall semester 1998
s99 Spring semester 1999
f99 Fall semester 1999
s00 Spring semester 2000
f00 Fall semester 2000
s01 Spring semester 2001
f01 Fall semester 2001
s02 Spring semester 2002
f02 Fall semester 2002

If a member of the group then <variable> = 1; 0 otherwise.

For the weekly class meetings (dichotomous) variables

mwf Class meets Monday, Wednesday, and Friday
tr Class meets Tuesday and Thursday
odw Class meets one day during the week
twd Class meets two days during the week

If a member of the group then <variable> = 1; 0 otherwise.

gpa Average grade point average for the class measured at the end of the semester. This independent variable is continuous.

For the time of day that the class meets (dichotomous) variables

1012 Class starts between 10am and Noon
1202 Class starts between Noon and 2pm
0204 Class starts between 2pm and 4pm
gt04 Class starts after 4pm

If a member of the group then <variable> = 1; 0 otherwise.

For the class room location (dichotomous) variables

as_ann Class meets in the Ag. Science Annex (including A7)
as_n Class meets in Ag. Science North
as_s Class meets in Ag. Science South
b52 Class meets in large lecture hall in Garrigus

cb	Class meets on central campus in the Classroom Building
ceb1f	Class meets in one of the first floor classrooms in Barnhart
ceb2f	Class meets in one of the second floor classrooms in Barnhart
gar89	Class meets in either Garrigus 108 or 109
tpc	Class meets in Thomas Poe Cooper Building

If a member of the group then <variable> = 1; 0 otherwise.

i = 1 to n = 22,997 for Q20 and n = 22,893 for Q21

Again, the purpose of this investigation is to statistically tests if required classes, class GPA, when the class meets during the week, time of day that the class meets, and location of the class room impacts the rating that instructors receive on UK's Standard Course Evaluation Form questions 20 and 21 (dependent variables Q20 and Q21). The dummy variables related to required classes include c100r, c200r, c300r, and c400r. The required courses included in this investigation are all undergraduate courses. Also note that all 200 courses included in the investigation are required. Many instructors in the College of Agriculture argue that your teaching evaluation scores for Q20 and Q21 will be lower if you teach required courses. Moreover, lower division required courses are more harshly rated because they include students from other programs who have no interest in the subject.

Of the focus variables, only GPA is continuous. The variable GPA measures the grade point average of the class measured after the course was completed. For example, if 10 students took the course and 5 received A's, 2 B's, 1 a C, and 2 E's (or F's) then the class GPA would be 4*{(4*5+3*2+2*1+1*0+0*2)/(4*10)} = 2.8. Some instructors argue that "tougher" classes, as measured by a lower class GPA, result in lower class ratings. On the other hand, instructors who grade inflate or who are know to give a large number of A's receive higher ratings.

The dummy variables related to day of the week that the class meets include MWF (for Monday, Wednesday, and Friday), TR (for Tuesday and Thursday), ODW (for meets once during the week), and TDW (for meets twice during the week other than TR). The ODW variable can represent any day of the week. Other TDW variable tends to be classes that meet Monday and Wednesday or Wednesday and Friday, but other combinations are possible. In this case there is conflicting anecdotal evidence from College colleagues, thus a priori expectations are difficult to determine. Yet some argue that day of the week matters.

Unlike day of the week, there are clear expectations as to time of day. Instructors that hold classes during the "Golden Window" between 10am and 2pm are thought to be more favorably assessed. Four dummy variables, 1012, 1202, 0204, and GT04, were included to assess the impact that time of the day that the class meets has on Q20 and Q21. In order, these variables represent classes that have start times between 10am and 12 noon, 12 noon and 2pm, 2pm and 4pm, and after 4pm.

Finally, location of the class is represented by the dummy variables AS_Ann, AS_N, AS_S, B52, CB, CEB1F, CEB2F, GAR89, and TPC. These variables, which signify buildings or areas within a building, are defined above. The physical make-up of the classroom is thought to affect how students rate an instructor. The college offers courses in room that range (in the opinion of colleagues) from modern, bright, clean, and well equipped to poorly maintained, dark, odd-shaped, and claustrophobic. These dummy variables attempt to capture the range of classrooms provided by the college. AS_Ann, B52, and TPC are particularly criticized by instructors as being poor classrooms and it is expected that these rooms act to reduce ones course ratings. Complication the analysis is the fact that CB and TPC are located some distance from the other classrooms. Instructors complain that they are rated lower because they teach classes that are not centrally located.

<u>Results for Q20: Overall value of the course</u>

The model for Q20 included 22,997 observations. Comparison of the log likelihood values between the estimated model (-17,131.23) and a model restricted to include only the intercept (-23,775.87) reveals that the independent variables of the model 1) contribute to our understanding of Q20 with 95% confidence, and 2) explain 28% of the variation in Q20 (based on a pseudo $R^2 = 0.279$). More important is the predictive power of the model. This model predicted the correct outcome 64.6% of the time. By category, the model correctly predicted 83 of 595 responses of “poor,” 650 of 2,168 responses of “fair,” 7,506 of 8,956 responses of “good,” and 6,625 of 11,278 responses of “excellent.”

The parameter estimates of model Q20 are provided in Table 2. Again, the results of order probit are difficult to interpret. In particular, the magnitude of an estimate is not important; it is the sign of the estimate and its t-statistic that is important. Interpretation will only focus on the 22 variables of interest, and then only if the parameter estimate is statistically different from 0 with 90% confidence. Furthermore, interpretation will focus on the ends of the probability distribution. Thus, given the marginal effects reported in Table 3, a variable increases the likelihood of receiving a rating of “excellent” or it increases the likelihood of receiving a rating of “poor.”

Of the 74 variables included in model Q20, 39 are statistically different from 0 (assuming a 0.10 level of significance). Nine of the 39 are variables of interest. Of the required classes, instructors of 300 level classes are more likely to receive a rating of “excellent.” Instructors who have classes offered Monday, Wednesday, and Friday or twice during the week (but not on Tuesday and Thursday) are also likely to receive a rating of “excellent.”

As expected, instructors of classes with higher class GPA’s are more likely to receive a rating of “excellent” on Question 20 “Overall value of the course.” But unexpected were the results related to time of day. Classes taught during the “Golden Window” between 10am and 2pm do not impact a student’s response to Q20. Moreover, instructors who taught classes after 4pm are more likely to receive a rating of “excellent.”

Finally, for model Q20, location of the classroom can matter. Instructors who taught in the Ag. Science North, B52, and C.E. Barnhart classrooms are more likely to receive a rating of “excellent.” These classrooms do tend to be more modern. However, the parameter estimates of the remaining classroom variables are not different from 0, thus stronger statements are not possible. The result for B52 was surprising as this room is generally criticized by instructor and student alike.

Results for Q21: Overall quality of teaching

The model for Q21 included 22,893 observations. Comparison of the log likelihood values between the estimated model (-15,731.11) and a model restricted to include only the intercept (-22,414.97) reveals that the independent variables of the model 1) contribute to our understanding of Q21 with 95% confidence, and 2) explain 30% of the variation in Q21 (based on a pseudo $R^2 = 0.298$). This model predicted the correct outcome 67.3% of the time. By category, the model correctly predicted 90 of 636 responses of “poor,” 458 of 1,822 responses of “fair,” 5,678 of 7,109 responses of “good,” and 9,182 of 13,326 responses of “excellent.” Overall, the model for Q21 predicted better than the model for Q20.

The parameter estimates and marginal effects for model Q21 are reported in Tables 4 and 5. Of the 74 variables included in the model, 37 are statistically different from 0 (assuming a 0.10 level of significance) and 13 of the 37 are variables of interest.

Of the required classes, instructors of 300 level classes are more likely to receive a rating of “excellent” for Q21, “Overall quality of teaching.” However, unlike the results for Q20, instructors of 100 and 200 level required classes are more likely to receive a rating of “poor.”

Instructors who have classes offered Monday, Wednesday, and Friday or Tuesday and Thursday or twice during the week are more likely to receive a rating of “excellent.” Offering the class once during the week did not affect an instructor’s rating. A higher class GPA also increases the likelihood of an instructor receiving a rating of “excellent.”

Like the day of the week, the time of day that the class was offered was also important. Interestingly, instructors of classes taught between 10am and noon and 2 and 4pm are more likely to receive a rating of “poor” on Q21. However, as was the case for Q20, instructors who taught classes after 4pm are more likely to receive a rating of “excellent.”

The location of the class was not as great a factor for Q21 as it was for Q20, but the results are more interesting. Instructors who taught classes on central campus in the Classroom Building (CB) are more likely to receive a rating of “poor.” On the other hand, instructors who taught classes in C.E. Barnhart classrooms are more likely to receive a rating of “excellent.”

Summary

Both models are equal in terms of being able to predict individual responses to questions 20 and 21. However, the variables that best contribute to our understanding of a student's rating differ between the two models.

For both Q20 (Overall value of the course) and Q21 (Overall quality of teaching), instructors of 300 level classes are more likely to receive a rating of "excellent." However, instructors of 100 and 200 level required classes are more likely to receive a rating of "poor" on Q21.

Instructors who have classes offered Monday, Wednesday, and Friday or twice during the week are likely to receive a rating of "excellent" on Q20 and Q21. Tuesday and Thursday classes are also beneficial to one's teaching rating with respect to Q21.

As expected, instructors of classes with higher class GPA's are more likely to receive a rating of "excellent" on Q20 and Q21. The time of day that the class is taught is also important. Surprising was the finding that instructors who taught classes after 4pm are more likely to receive a rating of "excellent" on both Q20 and Q21. However, instructors of classes taught between 10am and noon and 2 and 4pm are more likely to receive a rating of "poor" on Q21.

Location of the classroom, and by extension the physical characteristics of the classroom, can matter. Instructors who teach in Ag. Science North and B52 are more likely to receive a rating of "excellent" on Q20. Instructors who teach in C.E. Barnhart are more likely to receive a rating of "excellent" on both Q20 and Q21. However, instructors who taught classes on central campus in the Classroom Building (CB) are more likely to receive a rating of "poor" on Q21.

Discussion

As the case with most econometric studies, the question of "causality" is an issue. Take, for example, the finding that instructors who taught classes in the Classroom Building are more likely to receive a rating of "poor" on Q21. It is not possible to say that having to walk to a class located some distance from most Ag classes causes a student to place a lower rating on an instructor's quality of teaching. It is possible, but it is just as likely that poorer instructors happen to teach classes in the Classroom Building. The problem is that many instructors who view themselves as being good teachers receive lower than expected (or desired) rating for overall value of the course and overall quality of teaching. For these instructors, being able to point to external influences that affect ones rating on teaching evaluations is important. External factors of interest include if the class is required, the GPA of the class, when the class meets during the week, time of day that the class meets, and location of the class room.

The preliminary results of this investigation are interesting in that some agree with similar investigative finding from outside Agriculture and some do not. For example, in this investigation factors that increase ones evaluation score for Q20 “Overall value of the course” include being available for consultation, satisfactorily answering class questions, having freshman students in class, teaching a required course, having “A” students, having students who study 4 or more hours a week, and teaching a 200, 300, or 400 level course. Most studies outside of Agriculture find that, if there is any affect, teaching a required course tends to reduce ones teaching rating. The difference may have to do with the “nature” of required classes within the College of Agriculture (i.e., the class is required, but something in which the student is interested) and with the type of instructor (i.e., a regular faculty member rather than a graduate teaching assistant).

However, there were also counterintuitive results. For Q20 having a good text book, providing supplemental readings, writing exams that reflected what was taught, and stimulating interest in the subject acted to reduce ones teaching rating. Yet these same factors increase ones rating for Q21 “Overall quality of teaching.” Thus there appears to be tension between those factors that make a course valuable to a student and those factors that indicate good instruction.

Work on this investigation continues and adjustments to the analysis may account for some of the anomalies discussed above. For example, many of the independent variables used in the preliminary analysis were strongly correlated. Factor analysis suggests grouping of variables to eliminate this problem. New variables are also being added to the model. Of particular note are variables indicating day of week and time of day that the class met, variables representing physical location of the class (a finite number of class rooms are utilized by the College of Agriculture and some are known to be better for instruction than others), and a variable representing the GPA of the class based on grades assigned to students upon completion of the class. It is anticipated that these variable will alter the outcomes discussed above. Future analysis will also address estimation issues like infinite error variance and non-spherical errors; issues not addressed in the preliminary study.

References

Sorry, but the bulk of the literature review relative to teaching evaluations is forthcoming and will be provided at Montreal.

Greene, William H., Econometric Analysis. Macmillan Publishing Company, New York, NY. 1990. Pages 703-706.

Table 1: Questions asked by University of Kentucky's standard course evaluation form.

Section B – Course Items
1. Outlined course material and grading
2. Textbook contributed to understanding
3. Supplemental readings and assignments helped understanding
4. Exams reflected what was taught
5. Grading was fair and consistent
6. Assignments were distributed evenly
7. Graded assignments returned promptly
8. Graded assignments included comments

Section C – Instructor Items
9. Presented material effectively
10. Had good knowledge of the subject matter
11. Was available for consultation
12. Satisfactorily answered class questions
13. Stimulated interest of the subject
14. Encouraged class participation

Section D – Learning Outcomes
15. Learned to respect different viewpoints
16. Increased my ability to analyze and evaluate
17. Course helped my ability to solve problems
18. Gained understanding of concepts and principals
19. Course stimulated me to read further

Section E – Summary Items
20. Overall value of the course
21. Overall quality of teaching

Note that students are asked to indicate if they strongly disagree, disagree, agree, or strongly agree with questions 1 through 19. For questions 20 and 21 students are asked to indicate poor, fair, good, or excellent.

Table 2: Ordered probit estimation results for Q20 “Overall value of the course.”

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
Intercept	1	-3.5543*	0.1506	3.2592	3.8494	557.21	<.0001
Intercept2	1	1.2505	0.0252	1.2011	1.2999	2458.53	<.0001
Intercept3	1	3.0244	0.0287	2.9682	3.0806	11121.3	<.0001
Q07	1	0.3351	0.0133	-0.3613	-0.3090	630.70	<.0001
Q10	1	0.6062	0.0171	-0.6398	-0.5727	1255.17	<.0001
Q17	1	0.9383	0.0153	-0.9683	-0.9083	3756.26	<.0001
c_fr	1	0.2672	0.0625	-0.3897	-0.1448	18.29	<.0001
c_so	1	0.0069	0.0585	-0.1216	0.1079	0.01	0.9066
c_ju	1	-0.0899	0.0550	-0.0180	0.1977	2.67	0.1024
c_sr	1	-0.1523	0.0539	0.0467	0.2578	8.00	0.0047
c_gd	1	-0.0990	0.0636	-0.0258	0.2237	2.42	0.1200
usp	1	-0.1828	0.0351	0.1141	0.2515	27.18	<.0001
aec	1	0.0264	0.0340	-0.0931	0.0403	0.60	0.4373
agr	1	0.1943	0.0442	-0.2810	-0.1076	19.29	<.0001
asc	1	0.1796	0.0375	-0.2532	-0.1061	22.94	<.0001
bae	1	-0.0031	0.0544	-0.1035	0.1097	0.00	0.9545
cld	1	0.0478	0.0462	-0.1383	0.0428	1.07	0.3012
ent	1	0.1151	0.0506	-0.2144	-0.0159	5.17	0.0229
for	1	0.1783	0.0699	-0.3154	-0.0413	6.50	0.0108
hor	1	0.0360	0.0510	-0.1360	0.0639	0.50	0.4795
la	1	0.2821	0.0607	-0.4011	-0.1631	21.59	<.0001
abt	1	-0.0982	0.0682	-0.0355	0.2319	2.07	0.1501
gen	1	-0.4526	0.0390	0.3761	0.5291	134.47	<.0001
nrc	1	-0.0982	0.0675	-0.0341	0.2305	2.11	0.1459
pls	1	-0.0977	0.0428	0.0138	0.1817	5.21	0.0225
ecg_a	1	0.1920	0.0510	-0.2920	-0.0920	14.17	0.0002
ecg_b	1	-0.0210	0.0515	-0.0799	0.1220	0.17	0.6831
ecg_c	1	-0.3596	0.0564	0.2490	0.4702	40.60	<.0001
ecg_d	1	-0.7376	0.0980	0.5454	0.9297	56.61	<.0001
c_type	1	-0.0344	0.0488	-0.0612	0.1300	0.50	0.4807
itype_fac	1	-0.1629	0.0415	0.0816	0.2441	15.44	<.0001
itype_gta	1	-0.2282	0.0591	0.1125	0.3440	14.93	0.0001
c11to20	1	-0.0792	0.0362	0.0082	0.1502	4.78	0.0288
c21to30	1	-0.0214	0.0388	-0.0547	0.0974	0.30	0.5819
c31to40	1	0.0190	0.0423	-0.1019	0.0639	0.20	0.6536
c41to50	1	-0.1307	0.0499	0.0329	0.2286	6.86	0.0088
c51to60	1	-0.0359	0.0537	-0.0694	0.1411	0.45	0.5044
c_gt_60	1	-0.0940	0.0538	-0.0115	0.1994	3.05	0.0808
s_4to6	1	0.1001	0.0219	-0.1429	-0.0573	20.97	<.0001
s7to10	1	0.0956	0.0273	-0.1490	-0.0422	12.31	0.0005
s_gt10	1	-0.0895	0.0430	0.0053	0.1737	4.34	0.0373
C_100	1	0.1029	0.0708	-0.2417	0.0359	2.11	0.1461
c_300	1	0.2380	0.0508	-0.3376	-0.1384	21.95	<.0001
c_400	1	-0.0764	0.0504	-0.0224	0.1752	2.30	0.1298
c_500	1	0.0043	0.0466	-0.0957	0.0870	0.01	0.9257
c_100r	1	-0.0461	0.0529	-0.0575	0.1497	0.76	0.3832
c_200r	1	0.0798	0.0540	-0.1856	0.0260	2.19	0.1393
c_300r	1	-0.2182	0.0337	0.1521	0.2842	41.93	<.0001
c_400r	1	-0.0521	0.0461	-0.0383	0.1425	1.28	0.2583

See variable definitions on pages 7 through 9.
Pseudo R^2 = 0.279
This model predicted the correct outcome 64.6% of the time.

Table 2 (Continued): Ordered probit estimation results for Q20 “Overall value of the course.”

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
s98	1	0.0369	0.0387	-0.1128	0.0391	0.91	0.3413
f98	1	0.1535	0.0378	-0.2276	-0.0795	16.51	<.0001
s99	1	0.0883	0.0402	-0.1671	-0.0094	4.82	0.0282
f99	1	0.0587	0.0380	-0.1332	0.0159	2.38	0.1229
s00	1	0.0919	0.0421	-0.1743	-0.0094	4.77	0.0290
f00	1	0.0618	0.0382	-0.1367	0.0131	2.62	0.1057
s01	1	-0.0122	0.0397	-0.0656	0.0901	0.10	0.7578
f01	1	-0.0237	0.0387	-0.0522	0.0997	0.37	0.5403
s02	1	0.0266	0.0387	-0.1024	0.0493	0.47	0.4925
f02	1	0.0815	0.0403	-0.1606	-0.0025	4.09	0.0432
mwf	1	-0.1347	0.0746	-0.0115	0.2809	3.26	0.0710
tr	1	-0.1152	0.0734	-0.0286	0.2590	2.47	0.1164
odw	1	-0.0643	0.0789	-0.0903	0.2189	0.66	0.4151
tdw	1	-0.1292	0.0787	-0.0251	0.2835	2.70	0.1007
GPA	1	0.1296	0.0233	-0.1753	-0.0840	30.96	<.0001
t_1012	1	0.0038	0.0226	-0.0480	0.0405	0.03	0.8678
t_1202	1	0.0144	0.0260	-0.0654	0.0366	0.31	0.5797
t_0204	1	0.0267	0.0382	-0.1016	0.0482	0.49	0.4845
t_gt04	1	-0.1426	0.0661	0.0131	0.2722	4.65	0.0310
AS_Ann	1	-0.0154	0.0402	-0.0634	0.0942	0.15	0.7019
AS_N	1	-0.0903	0.0385	0.0149	0.1657	5.51	0.0189
AS_S	1	-0.0771	0.0533	-0.0274	0.1815	2.09	0.1481
RM_B52	1	-0.0979	0.0569	-0.0137	0.2094	2.96	0.0856
CB	1	0.0553	0.0663	-0.1853	0.0747	0.70	0.4043
CEB1F	1	-0.5577	0.1373	0.2885	0.8268	16.49	<.0001
CEB2F	1	-0.1605	0.0507	0.0612	0.2598	10.03	0.0015
GAR89	1	0.0173	0.0449	-0.1053	0.0706	0.15	0.6996
TPC	1	0.0252	0.0705	-0.1635	0.1130	0.13	0.7204

See variable definitions on pages 7 through 9.
Pseudo R^2 = 0.279
This model predicted the correct outcome 64.6% of the time.

Table 3: Marginal effects for evaluation categories Poor (1), Fair (2), Good (3), and Excellent (4) from Table 1 results for Q20 "Overall value of the course."

	MARG_1	MARG_2	MARG_3	MARG_4	CHECK
INTERCEPT	0.1716573	0.3004587	0.4143073	-0.886423	0
Q07	-0.016186	-0.02833	-0.039065	0.0835813	1.388E-17
Q10	-0.029278	-0.051247	-0.070665	0.1511902	0
Q17	-0.045317	-0.079319	-0.109375	0.2340108	2.776E-17
C_FR	0.0117278	0.021204	0.0337689	-0.066701	0
C_JU	-0.004437	-0.0077	-0.010241	0.0223781	-2.78E-17
C_SR	-0.00747	-0.012992	-0.017464	0.0379268	0
USP	-0.009451	-0.016097	-0.019773	0.0453209	-2.78E-17
AGR	0.008806	0.0157578	0.0239596	-0.048523	6.245E-17
ASC	0.0082006	0.0146396	0.0220265	-0.044867	-8.33E-17
ENT	0.0053135	0.0094533	0.0139956	-0.028762	0
FOR	0.0080623	0.0144414	0.0220413	-0.044545	5.551E-17
LA	0.012203	0.0221664	0.0360248	-0.070394	-1.39E-17
GEN	-0.025885	-0.042039	-0.042562	0.110487	-2.78E-17
PLS	-0.004864	-0.008416	-0.011046	0.0243263	-2.08E-17
ECG_B	-0.001019	-0.001781	-0.002444	0.0052441	-6.94E-18
ECG_C	-0.019885	-0.032846	-0.035579	0.0883095	1.388E-17
ECG_D	-0.049652	-0.07355	-0.05007	0.1732719	0
ITYPE_FAC	-0.00742	-0.013257	-0.02001	0.0406874	-6.25E-17
ITYPE_GTA	-0.012124	-0.020413	-0.023876	0.0564125	6.939E-18
C11TO20	-0.003898	-0.006773	-0.009054	0.0197242	6.939E-18
C41TO50	-0.006642	-0.011398	-0.014441	0.0324812	2.776E-17
C_GT_60	-0.004689	-0.008104	-0.010585	0.0233781	1.388E-17
S_4TO6	0.0047091	0.0083207	0.0119596	-0.024989	5.551E-17
S7TO10	0.0044702	0.0079168	0.0114906	-0.023878	0
S_GT10	-0.004484	-0.007736	-0.010034	0.0222539	0
C_300	0.0110996	0.0196551	0.0286314	-0.059386	-4.86E-17
C_300R	-0.011206	-0.019132	-0.023783	0.0541216	6.939E-18
F98	0.0070198	0.0125264	0.0187987	-0.038345	0
S99	0.0041253	0.0073077	0.0106165	-0.02205	2.082E-17
S00	0.0042851	0.0075954	0.011063	-0.022943	-1.39E-17
F02	0.0038225	0.0067632	0.0097735	-0.020359	0
MWF	-0.006607	-0.011492	-0.015451	0.0335501	2.776E-17
TDW	-0.006554	-0.011254	-0.0143	0.0321084	2.776E-17
GPA	-0.006259	-0.010956	-0.015107	0.0323219	0
T_GT04	-0.007323	-0.012512	-0.015563	0.0353989	3.469E-17
AS_N	-0.00446	-0.007739	-0.010282	0.0224809	4.163E-17
RM_B52	-0.004919	-0.008477	-0.010939	0.0243344	2.776E-17
CEB1F	-0.034657	-0.053925	-0.045281	0.1338631	0
CEB2F	-0.008215	-0.014051	-0.017568	0.0398336	6.939E-18

See variable definitions on pages 7 through 9.

Table 4: Ordered probit estimation results for Q21 “Overall quality of teaching.”

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
Intercept	1	-4.7553	0.1580	4.4456	5.0650	905.59	<.0001
Intercept2	1	1.1054	0.0242	1.0581	1.1527	2094.22	<.0001
Intercept3	1	2.6925	0.0276	2.6383	2.7467	9489.38	<.0001
Q07	1	0.4166	0.0138	-0.4437	-0.3894	906.55	<.0001
Q10	1	0.9060	0.0177	-0.9408	-0.8713	2609.40	<.0001
Q17	1	0.7476	0.0157	-0.7785	-0.7168	2254.92	<.0001
c_fr	1	0.1445	0.0662	-0.2742	-0.0148	4.77	0.0290
c_so	1	-0.0044	0.0614	-0.1160	0.1247	0.01	0.9434
c_ju	1	-0.0285	0.0575	-0.0842	0.1412	0.25	0.6200
c_sr	1	-0.0227	0.0562	-0.0875	0.1328	0.16	0.6867
c_gd	1	-0.0860	0.0661	-0.0434	0.2155	1.70	0.1928
usp	1	-0.0682	0.0384	-0.0070	0.1435	3.16	0.0756
aec	1	0.1374	0.0360	-0.2081	-0.0668	14.53	0.0001
agr	1	0.0704	0.0458	-0.1602	0.0194	2.36	0.1242
asc	1	0.0764	0.0393	-0.1534	0.0005	3.79	0.0516
bae	1	0.1734	0.0571	-0.2853	-0.0616	9.24	0.0024
cld	1	0.0309	0.0492	-0.1273	0.0655	0.39	0.5303
ent	1	-0.0163	0.0527	-0.0871	0.1196	0.10	0.7576
for	1	0.0239	0.0733	-0.1675	0.1198	0.11	0.7447
hor	1	-0.0960	0.0530	-0.0078	0.1999	3.29	0.0699
la	1	0.0915	0.0623	-0.2137	0.0306	2.16	0.1418
abt	1	0.0128	0.0721	-0.1543	0.1286	0.03	0.8587
gen	1	-0.1733	0.0422	0.0907	0.2560	16.90	<.0001
nrc	1	-0.1693	0.0683	0.0355	0.3031	6.15	0.0131
pls	1	-0.0031	0.0443	-0.0837	0.0900	0.01	0.9436
ecg_a	1	0.1544	0.0535	-0.2591	-0.0496	8.34	0.0039
ecg_b	1	-0.0403	0.0539	-0.0653	0.1460	0.56	0.4540
ecg_c	1	-0.3009	0.0588	0.1856	0.4161	26.17	<.0001
ecg_d	1	-0.4476	0.1015	0.2487	0.6465	19.45	<.0001
c_type	1	0.0260	0.0505	-0.1250	0.0731	0.26	0.6074
itype_fac	1	-0.0400	0.0440	-0.0464	0.1263	0.82	0.3643
itype_gta	1	-0.0500	0.0645	-0.0765	0.1765	0.60	0.4383
c11to20	1	-0.0850	0.0373	0.0119	0.1581	5.19	0.0227
c21to30	1	-0.0173	0.0402	-0.0614	0.0960	0.19	0.6669
c31to40	1	0.0531	0.0440	-0.1394	0.0331	1.46	0.2270
c41to50	1	-0.0310	0.0522	-0.0713	0.1333	0.35	0.5523
c51to60	1	0.0209	0.0565	-0.1317	0.0899	0.14	0.7113
c_gt_60	1	-0.0558	0.0567	-0.0552	0.1669	0.97	0.3243
s_4to6	1	0.0547	0.0230	-0.0998	-0.0095	5.64	0.0176
s7to10	1	-0.0105	0.0283	-0.0450	0.0659	0.14	0.7111
s_gt10	1	-0.1172	0.0442	0.0307	0.2038	7.04	0.0080
C_100	1	0.2828	0.0746	-0.4289	-0.1367	14.38	0.0001
c_300	1	0.2608	0.0525	-0.3637	-0.1580	24.70	<.0001
c_400	1	-0.0948	0.0517	-0.0066	0.1961	3.36	0.0668
c_500	1	-0.0419	0.0477	-0.0516	0.1354	0.77	0.3802
c_100r	1	0.1233	0.0565	-0.2341	-0.0124	4.75	0.0293
c_200r	1	0.3216	0.0561	-0.4316	-0.2116	32.84	<.0001
c_300r	1	-0.1887	0.0354	0.1193	0.2581	28.43	<.0001
c_400r	1	0.0338	0.0478	-0.1275	0.0599	0.50	0.4797

See variable definitions on pages 7 through 9.
Pseudo R^2 = 0.298
This model predicted the correct outcome 67.3% of the time.

Table 4 (Continued): Ordered probit estimation results for Q21 "Overall quality of teaching."

Parameter	DF	Estimate	Standard Error	95% Confidence Limits		Chi-Square	Pr > ChiSq
s98	1	0.0111	0.0404	-0.0903	0.0680	0.08	0.7832
f98	1	0.1022	0.0399	-0.1803	-0.0241	6.58	0.0103
s99	1	0.0838	0.0422	-0.1666	-0.0010	3.94	0.0472
f99	1	0.0668	0.0401	-0.1454	0.0118	2.77	0.0958
s00	1	0.1343	0.0443	-0.2210	-0.0475	9.20	0.0024
f00	1	0.0380	0.0402	-0.1169	0.0408	0.89	0.3444
s01	1	0.0099	0.0419	-0.0920	0.0722	0.06	0.8128
f01	1	0.0367	0.0410	-0.1172	0.0437	0.80	0.3709
s02	1	0.0237	0.0407	-0.1034	0.0561	0.34	0.5610
f02	1	0.0416	0.0423	-0.1245	0.0414	0.96	0.3263
mwf	1	-0.1840	0.0780	0.0312	0.3369	5.57	0.0183
tr	1	-0.1599	0.0767	0.0096	0.3102	4.35	0.0370
odw	1	-0.0708	0.0824	-0.0906	0.2322	0.74	0.3902
tdw	1	-0.1720	0.0822	0.0108	0.3331	4.37	0.0365
GPA	1	0.1783	0.0242	-0.2257	-0.1308	54.19	<.0001
t_1012	1	0.0543	0.0236	-0.1006	-0.0081	5.30	0.0214
t_1202	1	-0.0429	0.0272	-0.0105	0.0963	2.48	0.1153
t_0204	1	0.0740	0.0406	-0.1535	0.0056	3.32	0.0683
t_gt04	1	-0.1909	0.0677	0.0582	0.3237	7.95	0.0048
AS_Ann	1	-0.0184	0.0416	-0.0631	0.1000	0.20	0.6577
AS_N	1	-0.0574	0.0397	-0.0203	0.1352	2.10	0.1477
AS_S	1	-0.0140	0.0553	-0.0943	0.1224	0.06	0.7994
RM_B52	1	-0.0760	0.0594	-0.0405	0.1925	1.63	0.2010
CB	1	0.2612	0.0714	-0.4011	-0.1212	13.37	0.0003
CEB1F	1	-0.5693	0.1435	0.2880	0.8506	15.73	<.0001
CEB2F	1	-0.1764	0.0532	0.0722	0.2806	11.00	0.0009
GAR89	1	0.0686	0.0468	-0.1604	0.0232	2.14	0.1431
TPC	1	0.0673	0.0740	-0.2122	0.0777	0.83	0.3632

See variable definitions on pages 7 through 9.
Pseudo R^2 = 0.298
This model predicted the correct outcome 67.3% of the time.

Table 5: Marginal effects for evaluation categories Poor (1), Fair (2), Good (3), and Excellent (4) from Table 3 results for Q21 "Overall quality of teaching."

	MARG_1	MARG_2	MARG_3	MARG_4	CHECK
INTERCEPT	0.2137205	0.3243614	0.6220597	-1.160141	0
Q07	-0.018721	-0.028413	-0.054491	0.101626	0
Q10	-0.04072	-0.0618	-0.118521	0.221041	-2.78E-17
Q17	-0.033602	-0.050997	-0.097802	0.1824003	-2.78E-17
C_FR	0.0061623	0.0094948	0.0192361	-0.034893	1.388E-17
USP	-0.003146	-0.004737	-0.008833	0.0167164	6.939E-18
AEC	0.0059602	0.009139	0.0181972	-0.033296	1.18E-16
ASC	0.0033528	0.0051252	0.0100874	-0.018565	1.388E-17
BAE	0.0072841	0.0112697	0.0231798	-0.041734	6.939E-17
HOR	-0.004491	-0.006732	-0.01235	0.0235735	0
GEN	-0.008309	-0.012349	-0.022019	0.0426767	8.327E-17
NRC	-0.008195	-0.012142	-0.021407	0.0417434	-6.94E-18
ECG_A	0.00692	0.0105058	0.0201955	-0.037621	-2.78E-17
ECG_C	-0.015157	-0.022125	-0.037127	0.0744084	0
ECG_D	-0.024635	-0.034727	-0.051832	0.1111949	8.327E-17
C11TO20	-0.003898	-0.005878	-0.01102	0.0207954	2.082E-17
S_4TO6	0.002422	0.0036918	0.007191	-0.013305	0
S_GT10	-0.005533	-0.008268	-0.01501	0.0288113	-2.78E-17
C_100	0.0118751	0.0183575	0.0377326	-0.067965	4.163E-17
C_300	0.0112795	0.017294	0.0345049	-0.063078	8.327E-17
C_400	-0.004388	-0.006598	-0.012248	0.0232327	-1.11E-16
C_100R	0.0053487	0.0082007	0.01632	-0.029869	-3.47E-17
C_200R	0.0128144	0.0200888	0.0434376	-0.076341	2.776E-17
C_300R	-0.008948	-0.013345	-0.024092	0.0463854	-8.33E-17
F98	0.0044283	0.0067937	0.0135461	-0.024768	-1.04E-16
S99	0.0036488	0.0055897	0.0110863	-0.020325	-4.16E-17
F99	0.0029295	0.004478	0.0088118	-0.016219	-5.55E-17
S00	0.0057337	0.0088315	0.0178681	-0.032433	-1.11E-16
MWF	-0.008452	-0.012734	-0.023835	0.0450198	6.939E-18
TR	-0.007313	-0.011035	-0.020755	0.0391029	1.18E-16
TDW	-0.008256	-0.012265	-0.02183	0.0423519	0
GPA	-0.008012	-0.01216	-0.023321	0.0434935	-6.94E-18
T_1012	0.0024143	0.0036765	0.0071372	-0.013228	-2.78E-17
T_0204	0.0032334	0.0049475	0.0097714	-0.017952	-2.78E-17
T_GT04	-0.009322	-0.01377	-0.024022	0.0471145	8.327E-17
CB	0.0105564	0.0164956	0.035209	-0.062261	4.163E-17
CEB1F	-0.033186	-0.045582	-0.062562	0.1413301	-2.78E-17
CEB2F	-0.008458	-0.01257	-0.022406	0.0434336	8.327E-17

See variable definitions on pages 7 through 9.