Multiple regression SPSS practice problems – Answers

Problem 1

1. The proportion of variability accounted for is .715. The regression equation using all of the predictor variables is: predicted score for overall = -1.393 + .608(teach) - .537(exams) + .768(knowledg + .451(grade) -.000628(enroll). The regression equation accounts for a significant amount of variability, $F(5,9) = 4.506$, $p=.025$.
2. The predictor variable TEACH entered the regression model first. The squared correlation with this one predictor variable was .595. No other predictor variable entered the regression equation. The final version of the regression equation is predicted OVERALL = .994 + .709(TEACH). The proportion of variability accounted for by the final version of the regression equation is .595.
3. The predictor variable with the weakest unique contribution was ENROLL. The unique contribution was a proportion of variability of .006. This unique contribution was not significant so ENROLL was eliminated from the regression equation. In the second step KNOWLEDG was identified as having the weakest unique contribution of the remaining predictors (.018). This proportion of variability was not significant so KNOWLEDG was eliminated from the equation. In the third step, EXAMS was identified as having the weakest unique contribution from among the remaining variables (.018). This proportion of variability was not significant so EXAMS was eliminated from the equation. In the final step, GRADE was identified as having the smallest unique contribution (.078). This proportion of variability was not significant so GRADE was eliminated from the equation. The only predictor variable remaining in the equation was TEACH. The final version of the regression equation is predicted OVERALL = .994 + .709(TEACH). The proportion of variability accounted for by the final version of the regression equation is .595.
4. TEACH accounts for a significant amount of variability above and beyond that accounted for by ENROLL, $F(1,12) = 15.337$, $p = .002$. The unique contribution of TEACH is a proportion of variability of .514.
5. Proportion of variability accounted for by TEACH and ENROLL entered in the regression equation together -- .598
   Proportion of variability not accounted for by the two predictor variables -- .402
   Unique contribution of TEACH -- .514
   Unique contribution of ENROLL -- .003
   Overlap between TEACH and ENROLL -- .081

Problem 2

1. The proportion of variability accounted for is .163. The regression equation using all of the predictor variables is: predicted score for MEDINDEX = .346 - .000756(ARMS) - .000514(QUADS) + .000246(INJURY) + .000264(AGE). The regression equation accounts for a significant amount of variability, $F(4, 95) = 4.626$, $p=.002$.
2. The predictor variable INJURY entered the regression model first. The squared correlation with this one predictor variable was .114. No other predictor variable entered the regression equation. The final version of the regression equation is predicted MEDINDEX = .464 + .000339(INJURY). The proportion of variability accounted for by the final version of the regression equation is .105.
3. The predictor variable with the weakest unique contribution was QUADS. The unique contribution was a proportion of variability of .007. This unique contribution was not significant so QUADS was eliminated from the regression equation. In the second step AGE was identified as having the weakest unique contribution of the remaining predictors (.02). This proportion of variability was not significant so AGE was eliminated from the equation. In the third step, ARMS was identified as having the weakest unique contribution from among the remaining variables (.021). This proportion of variability was not significant so AGE was eliminated from the equation. The only predictor variable remaining in the equation was INJURY. The final version of the regression equation is predicted MEDINDEX = .464 + .000339(INJURY). The proportion of variability accounted for by the final version of the regression equation is .105.
4. INJURY accounts for a significant amount of variability above and beyond that accounted for by AGE, $F(1,97) = 8.94$, $p = .004$. The unique contribution of INJURY is a proportion of variability of .080.
5. Proportion of variability accounted for by INJURY and AGE entered in the regression equation together -- .133
   Proportion of variability not accounted for by the two predictor variables -- .867
   Unique contribution of INJURY -- .080
   Unique contribution of AGE -- .019
   Overlap between INJURY and AGE -- .034