

Using Exploratory Factor Analysis to Find the Most Impactful Factors on Student Exam Performance.

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ABSTRACT

Introduction: Exams are a very important part of academia and tests students on whether they can apply what they learned. Performance on these exams can indicate whether a student will pass a course. This research will be important in identifying factors that could help students better prepare for exams. The goal of this study is to use exploratory factor analysis to find the factors with the biggest impact on exam performance.

Methods: The data set used includes 6,607 observations. All of which was randomly generated to simulate realistic scenarios. The data set was then found and downloaded from Kaggle. The data included ten dimensions. Both *Previous Scores* which was the scores of previous exams, and *Sleep Hours*, the average number of hours students slept, loaded onto the factor “Sleep Effectiveness”. The response variable *Exam Score* had the following predictive variables: *Sleep Effectiveness*, *Extracurricular Activities*, *Parental Involvement*, *Attendance*, *Teacher Quality*, *Tutoring Sessions*, and *Hours Studied*.

Results: Using exploratory factor analysis, we found a significant effect of *Attendance*, *Parental Involvement*, *Teacher Quality*, *Extracurricular Activities*, *Tutoring Sessions*, and *Hours Studied* on *Exam Scores*, all of which had an SE of 0.007, and a p-value of 0.000. We found that of those variables, *Hours studied*, and *Attendance* had the strongest effect on *Exam Scores* with their β values being .587, and .452 respectively.

Conclusion: We measured the model fit using fit indices. The GFI value is 0.998, which is above the .95 threshold. The RMSEA has a value of 0, which is below the 0.08 threshold. The CFI was also above the .95 threshold with a value of 1.00. These fit indices show that our model is the best fit for this data set. These findings show the importance for instructors and educational institutions to enforce attendance standards, while also encouraging students study sessions.

