# Role Of Family Engagement Moderated by Country and Mediated by Student Engagement On Science Achievement Among UAE And Singapore Students

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## Abstract

The present study examines the impact of Family Engagement (FE) on Science Achievement (SA), moderated by country and mediated through Student Engagement (StEng) among students from the UAE and Singapore. The respective items on FE and StEng were analyzed using Structural Equation Modeling Partial Least Square (SEM-PLS) with the PISA 2022 database. Participants included 259 students (n = 196 UAE; n = 63 Singapore), all of whom answered all relevant questions. The outcomes showed the significant effect of FE on StEng (Path coefficient: 0.25) and significant impact of StEng on SA (Path coefficient: 0.23), highlighting the mediating effect of StEng. While country was found not to be a moderating factor on FE and StEng (-0.06, p = 0.80), country-specific analysis revealed Singapore had a stronger effects of FE on StEng and SA (path coefficient: 0.18) than UAE (0.04). SA was confirmed with substantial (0.93–0.95) and acceptable loadings (>0.5) for StEng and FE, respectively. Nevertheless, relatively poor R-square values for both StEng (0.07) and SA (0.10) point to limited explanatory power. These trends reflect nuanced relationships across cultural contexts between FE, StEng and SA with implications for tailoring family engagement efforts that leverage cultural differences to maximize academic benefit. The study contributes to our understanding of the complex dynamics of be science achievement and the variables influencing it across cultures, offering practical recommendations for policymakers and educators seeking to improve student outcomes in science.

**Keywords:** Family Engagement; PISA 2022; Student Engagement; Science Achievement; Singapore Education; UAE Education