The Mediating Role of Executive Functions in the Relationship between E-Learning Readiness and Academic Performance during the COVID-19 Pandemic

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Extended Abstract

Aim

The COVID-19 pandemic has caused extensive disruptions in numerous sectors, with education being particularly hard hit. Due to the abrupt and far-reaching consequences of the pandemic, academic establishments across the globe were compelled to swiftly adjust to remote learning approaches, predominantly utilizing e-learning platforms. The transition to online learning in Iran presented a distinct array of obstacles, especially for pupils who were required to develop critical competencies, such as e-learning preparedness, in order to successfully navigate this emerging educational environment. The primary objective of this research endeavor is to investigate the complex correlation that exists between e-learning preparedness and academic performance among high school pupils in Tehran, Iran, during the COVID-19 pandemic. Furthermore, this study examines the potential mediating effect of executive functions on this intricate interaction.

Methodology

In order to accomplish these goals, a descriptive-correlational approach to research was utilized, with path analysis functioning as the principal statistical instrument. A cohort consisting of 100 male pupils, aged 7 to 12, was selected using a cluster random sampling technique from five high schools located in Tehran. The academic performance of these students was evaluated using self-reported GPAs as a measure and the Watkins E-Learning Readiness (WER) questionnaire and the Barkley Deficits in Executive Functioning Scale (BDEFS), both of which were administered online. Following an exhaustive examination, it was determined that 93 questionnaires were entirely amenable to analysis. By employing SPSS version 27 and LISREL software, we were able to perform statistical analysis and investigate the mediating function of executive functions.

Findings

The findings revealed a statistically significant relationship ($\beta=0.51$; $t=5.62$; $p<0.01$) between e-learning readiness and GPA. This suggests that students who demonstrated greater levels of preparedness for e-learning were more likely to attain exceptional academic results. In addition, it was demonstrated that e-learning readiness was a significant predictor of executive functions ($\beta=0.46$; $t=9.91$; $p<0.01$). This finding implies that students who possessed strong e-learning readiness also possessed improved abilities in executive functioning. It is noteworthy that executive functions substantially predicted GPA ($\beta=0.20$; $t=2.18$; $p<0.01$). Significantly, the incorporation of executive functions into the association improved the predictive power of GPA via e-learning preparedness ($R2=0.37$), thereby yielding an increased degree of predictability ($R2=0.40$). The results of this study emphasize the significance of executive functions in mediating the relationship between academic performance and aptitude for e-learning.

Conclusion

In summary, this study highlights the critical importance of executive functions and preparedness for e-learning in influencing academic achievement during the COVID-19 pandemic. The knowledge obtained from this study provides significant recommendations for educational policymakers, educators, and parents, aiding them in the development of executive functioning abilities and preparedness for e-learning among students, which ultimately contributes to enhanced academic performance. The results of the study support the notion that pupils who possess proficient abilities in utilizing digital tools and interacting with mentors, peers, and educational resources are more inclined to implement effective e-learning approaches, which ultimately lead to exceptional scholastic achievements. Given the profound transformations precipitated by the COVID-19 pandemic, it is therefore critical that students are suitably equipped for electronic education. Amidst this paradigm shift in the field of education, self-regulation and other strategies pertaining to executive functioning surfaced as critical determinants of student achievement. Students who possessed highly developed self-regulated learning abilities exhibited enhanced autonomy in time management and academic pursuit organization, thereby optimizing their electronic learning experiences and making academic progress. It is apparent from the results that those who possess greater aptitude for e-learning and stronger components of executive functioning are more likely to attain academic success. Hence, integrating executive functioning elements into e-learning programs is highly advised, alongside enhancing initiatives to prepare learners for e-learning.

Keywords: Academic Performance, COVID-19 Pandemic, E-Learning Readiness, Executive Functions, High School Students.