



Adapting Gamification Techniques for Cognitive Behavioural Therapy among Adolescents with Anxiety Disorders in Cairo: A Systematic Literature Review

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Abstract

Adolescents with anxiety disorders in Cairo often seek cognitive behavioural therapy (CBT), but traditional CBT can be challenging to engage and maintain. Gamification techniques have shown promise for enhancing engagement, motivation, and adherence to treatment. A comprehensive search of databases including PubMed, Web of Science, and Google Scholar was conducted. Studies published between and were included if they described interventions that combined gamification with CBT for adolescents with anxiety disorders in Cairo. Gamification techniques such as point systems, badges, leaderboards, and avatars significantly increased engagement ($p < 0.05$) compared to traditional CBT methods among adolescent participants. The review underscores the potential of gamification for improving treatment adherence and effectiveness in adolescent anxiety disorder populations in Cairo. Future research should focus on developing and testing specific gamified interventions in controlled clinical trials, with a particular emphasis on long-term outcomes. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda lVert\theta rVert^2$, with performance evaluated using out-of-sample error.

Keywords: *Cognitive behavioural therapy, Gamification, Adolescents, Anxiety disorders, Cairo, Egypt, Psychological interventions, Systematic review*

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