INPLASY

Practice of digital technology use in college students' social emotional learning：A systematic review and meta-analysis

INPLASY2024120033
doi: 10.37766/inplasy2024.12.0033
Received: 9 December 2024
Published: 9 December 2024

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2024120033

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 December 2024 and was last updated on 9 December 2024.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aims to explore the impact of digital technologies on the social emotional learning of college students in higher education and to present the overall quantitative relationship between them. Given the significant influence digital technologies have on educational models, this study not only addresses a theoretical gap but also offers empirical evidence and practical guidance for educational practitioners.

Condition being studied Prior research has shown that the competencies related to social emotional learning are critical factors for student success, and are essential for the daily and long-term development of children, adolescents, and adults. Proximally, social emotional learning influences students' emotional literacy skills, while distally, it affects their academic performance, relationship quality, health, and well-being, personal development and social adaptability. Most existing research has primarily focused on early childhood and primary education, with much attention given to populations with special education needs, particularly children with autism or emotional disorders. However, there is a lack of in-depth and systematic exploration of social emotional learning needs among the general population of college students, especially regarding the relationship between digital technology use and college students' social emotional learning in higher education. As future builders and key contributors to society, college students need to develop strong emotional management, interpersonal, and teamwork skills to face complex social challenges and contribute to societal progress.

METHODS

Participant or population College students.

Intervention Studies that reported the use of digital technology measured by validated quantification tools were included.

Comparator No specific comparator was requied.

Study designs to be included Only studies focusing on the relationship between digital technologies and the social emotional learning of college students were included. Non-empirical studies, reviews, conference papers, and guidelines were excluded from the analysis.

Eligibility criteria For the systematic review, studies were selected on the following inclusion criteria: Population: Study participants were among college students in higher education. Studies specifically targeting students with disabilities or discussing the use of digital technologies without focusing on higher education were excluded.
Intervention: Studies that reported the use of digital technology measured by validated quantification tools were included.
Comparator: No specific comparator was requied.
Outcomes: The outcomes of the included studies must focus on one or more aspects of social emotional learning/competencies.
Study design: Only studies focusing on the relationship between digital technologies and the social emotional learning of college students were included. Non-empirical studies, reviews, conference papers, and guidelines were excluded from the analysis.

Information sources We searched the Web of Science and Scopus databases to collect studies published up to May 2024. The search keywords included synonyms of "digital technology" combined with synonyms of "social emotional learning" to ensure a more comprehensive search. Additionally, manual searches were performed to identify relevant research by reviewing the bibliographies of the retrieved papers.

Main outcome(s) Using the PICO-S framework (Population, Intervention, Comparison, Outcomes, and Study Design) and PRISMA guidelines, the Web of Science and Scopus databases were systematically searched for studies published up to May 10, 2024. Among 3153 social emotional-related papers, 19 studies involving 6,290 college students were included in the final analysis. When the meta-analysis was conducted by the type of digital technologies, the overall estimated correlation between each type of technology and social emotional learning was examined.

Quality assessment / Risk of bias analysis The risk of bias in the selected studies was assessed using the modified Newcastle-Ottawa Scale (NOS).

Strategy of data synthesis To quantitatively assess the association between digital technology and social emotional learning, the pooled correlation coefficient was estimated using Fisher's z-transformation and inverse transformation. We used the correlation coefficients of individual studies, treating each result as a separate study when multiple subgroup results were reported within one study. A hypothesis test was conducted with a 95% confidence interval (CI) to determine the statistical significance of the pooled correlation coefficients. The pooled correlation coefficients were interpreted according to Cohen's standards. Cochran's Q-statistic and the I^2-statistic were used to evaluate heterogeneity among the studies included in the meta-analysis. A fixed-effects model or random-effects model was applied depending on the significance of heterogeneity ($P < .10$ and $I^2 \geq 50\%$) (Higgins, 2008). To assess the validity of the results, funnel plots and Egger's regression were used to evaluate publication bias. The total effect size (i.e., pooled correlation coefficient) was derived from the relevant variables of the participants in each study, along with all studies that could be quantitatively synthesized.

Subgroup analysis The types of digital technology were categorized based on the characteristics of the included studies, and the correlation between each type of digital technology and social emotional learning (intrapersonal, interpersonal, and cognitive competences) was described. The impact of digital technology use on social emotional learning was assessed by evaluating the correlation between digital technology use and three dimensions of social emotional learning.No specific comparator was requied.

Sensitivity analysis When publication bias was suspected, the trim-and-fill method was used to test the severity of the bias, estimating the extent to which publication bias impacted the validity of the results.

Country(ies) involved China.

Keywords Meta-analysis, digital technologies, virtual reality, social media, distance learning, social emotional learning.

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