



The role of social and emotional skills on adolescents' life satisfaction and academic performance

Patricia Ayllón-Salas & Francisco D. Fernández-Martín

Universidad de Granada, Granada (Spain)

KEYWORDS

Socioemotional competencies
Life satisfaction
Adolescents
Academic performance
High school

ABSTRACT

The COVID-19 pandemic, which emerged in 2019, has had a significant impact on the mental health of adolescents, leading to symptoms such as anxiety and depression, and a decrease in their overall life satisfaction. In the educational context, social and emotional competencies have gained increasing importance due to their potential to enhance various aspects of academic, personal, and professional life. This study aimed to assess the socioemotional competencies of 1,270 secondary school students and explore their connection with life satisfaction and academic achievement. For this purpose, the *Social and Emotional Learning Scale*, the Spanish adaptation of the *Life Satisfaction Scale*, and an ad-hoc questionnaire that collected the sociodemographic variables of gender, age, and academic performance, were administered. The Mann-Whitney U test for two independent samples, the Kruskal-Wallis H test for independent samples, and the Spearman's correlation analysis were conducted to examine the relationships between the variables. In summary, the study revealed statistically significant differences social and emotional competencies based on gender, but there were no discernible differences based on age. Furthermore, the results indicated a positive relationship between life satisfaction, social and emotional competencies, and academic performance. The findings of this study hold significant importance as they contribute to our understanding of the factors impacting the well-being of adolescents. Hence, in the current post-pandemic era, there is an even greater urgency to design and implement high-quality interventions centered around social and emotional learning in education, particularly from an early age.

El papel de las habilidades sociales y emocionales en la satisfacción con la vida y el rendimiento académico de los adolescentes

PALABRAS CLAVE

Competencia socioemocional
Satisfacción con la vida
Adolescentes
Rendimiento académico
Educación secundaria

RESUMEN

La pandemia de COVID-19 ha tenido un impacto significativo en la salud mental de los adolescentes, provocando síntomas como ansiedad y depresión y una disminución de su satisfacción con la vida. En el contexto educativo, las competencias sociales y emocionales han adquirido una importancia creciente debido a su potencial para mejorar diversos aspectos de la vida académica, personal y profesional. Este estudio pretende evaluar las competencias socioemocionales de 1,270 estudiantes de secundaria y explorar su conexión con la satisfacción vital y el rendimiento académico. Para ello, se administraron la *Escala de Aprendizaje Socioemocional*, la adaptación española de la *Escala de Satisfacción Vital* y un cuestionario ad-hoc que recogía las variables sociodemográficas de género, edad y rendimiento académico. Para examinar las relaciones entre las variables se realizaron la prueba U de Mann-Whitney para dos muestras independientes, la prueba H de Kruskal-Wallis para muestras independientes, y el análisis de correlación de Spearman. Los resultados del estudio revelaron diferencias estadísticamente significativas en función del sexo, pero no en función de la edad. Además, los resultados indicaron una fuerte relación positiva entre la satisfacción vital, las competencias sociales y emocionales y el rendimiento académico. Los resultados de este estudio tienen una importancia significativa, ya que contribuyen a nuestra comprensión de los factores que influyen en el bienestar de los adolescentes. De ahí que, en la actual era postpandemia, sea aún más urgente diseñar y aplicar intervenciones de alta calidad centradas en el aprendizaje social y emocional en la educación, sobre todo desde edades tempranas.

* *Corresponding author:* Patricia Ayllón-Salas. Department of Developmental and Educational Psychology, Faculty of Education Sciences, University of Granada, Campus Universitario de Cartuja, s/n, 18071 Granada, Spain. patriayllonsalas@gmail.com

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The COVID-19 pandemic, which emerged in 2019, necessitated the adoption of stringent measures to contain the virus's transmission (e.g., lockdowns or physical and social distancing) (Balayar & Langlais, 2022). UNESCO has officially labeled COVID-19 as the most unprecedented disruption to education in the history of the world, affecting over 1.57 billion students (United Nations, 2020). The periods without traditional face-to-face instruction, the adjustment to online and distance learning, and the cancellation of extracurricular activities have affected to students, leading to a decline in physical and mental health, social skills, and academic performance (Gao et al., 2020; Singh et al., 2020).

In particular, adolescents have borne the brunt of these restrictions. Adolescence is a period of life spanning 10 to 19 years of age (World Health Organization, 2006) which represents a pivotal stage in which identity, autonomy, and social connections flourish (Hollenstein & Loughheed, 2013). Consequently, adolescents are more vulnerable to the emergence of behavioral and mental health issues (Branje & Morris, 2021). Due to COVID-19, teenagers are experiencing more symptoms related to anxiety, depression, loneliness, stress, fear, tension, fatigue, impulsiveness, emotional instability, sleep troubles, and even suicidal behaviors (Hossain et al., 2020; Theberath et al., 2022). Hence, it is plausible that the pandemic has negatively affected mental well-being of teenagers, potentially reducing their overall life satisfaction (Torales et al., 2020).

In this context, the management and regulation of emotions are considered crucial for maintaining adaptive psychosocial functionality during adolescence (Turan, 2021). Therefore, interventions based on Social and Emotional Learning are experiencing increased prominence and could be considered a protective factor to address the challenges arising from the pandemic (Turan, 2021). Social and Emotional Learning is defined as:

the process through which all young people and adults acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions. (Collaborative for Academic, Social, and Emotional Learning [CASEL], 2021, p. 6).

The CASEL framework from the USA is likely one of the most influential frameworks in the Social and Emotional Learning (SEL) literature (Lee & Junus, 2023). It conceptualizes SEL based on the development of five core competencies (Aguilar et al., 2019; Clarke et al., 2021; Smith et al., 2017): (a) self-control, (b) relationship skills, (c) responsible decision-making, (d) self-awareness, and (e) social awareness.

In addition to the CASEL framework, the Organisation for Economic Co-operation and Development (Chernyshenko et al., 2018; Organisation for Economic Co-operation and Development, 2021) has developed a framework based on the Big Five model, encompassing emotional regulation, task performance, open-mindedness, collaboration, and engagement with others.

Nevertheless, there is a need for further empirical evidence to assess the cross-cultural applicability of the Organisation for Economic Co-operation and Development framework (Lee & Junus, 2023).

The level of social and emotional competence may vary depending on sociodemographic characteristics such as gender (Branquinho et al., 2023; Zych et al., 2018) and age (Branquinho et al., 2023; Cappella et al., 2019; Zych et al., 2018). For instance, girls have demonstrated greater development in areas like social awareness, pro-social behavior, and responsible decision-making, while boys have shown stronger self-control (Zych et al., 2018). Furthermore, it has been observed that adolescents tend to experience a decline in their social and emotional competencies over time (Cappella et al., 2019; Zych et al., 2018). In contrast, other studies have demonstrated that self-control increases with age (Aguilar et al., 2019; Portela-Pino et al., 2021). Nevertheless, a recent study has shown that there are no statistically significant differences based on age among adolescents (Fernández-Martín et al., 2022).

The development of Social and Emotional Learning has diverse effects on people's quality of life, including its impact on academic performance (Corcoran et al., 2018; Mira-Galvañ & Gilar-Corbi, 2020) and life satisfaction (Turan, 2021). Life satisfaction pertains to an individual's holistic assessment of their quality of life, based on personal criteria and standards (Shin & Johnson, 1978). It relies on comparing one's personal circumstances with self-defined benchmarks, making it an internally derived measure rather than externally imposed (Diener et al., 1985). The concept of life satisfaction has taken on a psychosocial and humanistic dimension since the 1970s, marking its increasing relevance (López-Cassá et al., 2018). Consequently, it is now regarded as one of the key indicators of an individual's quality of life (López-Cassá et al., 2018). Life satisfaction exhibits variations based on sociodemographic factors like gender and age, reporting higher levels among girls (Álvarez et al., 2017; Branquinho et al., 2023) and younger adolescents (Branquinho et al., 2023). In addition, life satisfaction is related to academic performance (Ng et al., 2015). However, studies exploring this link have yielded inconsistent findings as results differed based on cultural and contextual situations with outcomes varying depending on cultural and contextual factors (Credé et al., 2015).

Indeed, social and emotional competencies has been demonstrated as a predictor of life satisfaction (Branquinho et al., 2023; García-Martínez et al., 2023; Turan, 2021). Branquinho et al. (2023) revealed the significant influence of social and emotional competencies on the life satisfaction of young individuals. Notably, these competencies accounted for a substantial 69% of the variance in life satisfaction (Branquinho et al., 2023).

Definitely, social and emotional competencies play a crucial role in helping individuals adapt to changes in their environment (Branquinho et al., 2023). This enhanced adaptability can have a significant impact on life satisfaction (Branquinho et al., 2023) as well as in academic performance (Corcoran et al., 2018; Mira-Galvañ & Gilar-Corbi, 2020). Considering all these factors, social and emotional competencies can empower adolescents to

cultivate skills that enhance their well-being and foster their life satisfaction (Turan, 2021), mitigating the adverse impacts of the pandemic on young individuals and society as a whole.

Given the lack of studies examining the relationships between social and emotional competencies, life satisfaction, and academic performance, it is essential to conduct studies that analyze and identify profiles and variations based on socio-demographic, personal, and school-related factors. This step is crucial for improving the effectiveness of interventions targeting social and emotional competencies that improve life satisfaction among adolescents.

The present study

This study seeks to address the following research questions: Are there variations in the levels of social and emotional competence and life satisfaction based on sociodemographic factors such as age and gender? Is there a relationship between life satisfaction, social and emotional competence, and academic performance? Thus, the aim of this educational research is to evaluate the socioemotional competencies of adolescents after the pandemic and examine their relationship with life satisfaction and academic performance. Therefore, the hypotheses established are the following: (1) girls will show a higher level of social awareness and responsible decision-making, while boys will show a higher level of self-control; (2) there will be no statistically significant differences in social and emotional competencies according to age; (3) boys will show a higher level of life satisfaction; (4) younger adolescents will have higher level of life satisfaction than older adolescents; and (5) the level of social and emotional competencies will be positively related to life satisfaction and academic performance.

Method

Participants

The selection of participants was conducted through a non-probabilistic convenience sampling procedure (Etikan et al., 2016).

The study involved 1,270 secondary school students in the province of Granada (Spain), aged between 12 and 18 years, with an average age of 15.9 ($SD = 1.61$). Of these participants, 739 (55.2%) were male and 531 (44.8%) were female. They were distributed across various school years: 337 were in the first year (26.5%), 291 in the second year (22.9%), 324 in the third year (25.5%), and 318 in the fourth year (25%).

Instruments

Ad-hoc questionnaire. It recorded the sociodemographic variables of gender, age, and academic performance in the current course using a questionnaire developed specifically for this purpose. Academic performance was assessed by considering the participants' grade point averages in the 2022/2023 academic year.

Social and Emotional Learning Scale (Fernández-Martín et al., 2022). This instrument adopts a Likert-type structure and comprises 30 items, each offering four response options (i.e., 1 = *Never or rarely*; 2 = *Occasionally*; 3 = *Often*; and 4 = *Almost always or always*). This scale assesses five areas of socioemotional competence, as defined by Fernández-Martín et al. (2022): (a) self-awareness: ability to recognize and label one's emotions, maintaining a positive and confident self-perception, and be conscious of one's strengths and weaknesses; (b) social awareness: ability to empathize with others, comprehend ethical and social norms, adopt different perspectives, appreciate diversity, and exhibit respect for others; (c) self-control: ability to manage emotions, handle stress, self-motivate, set goals, and effectively organize oneself; (d) relationship skills: ability to establish healthy relationships with a diverse range of people, practicing effective communication, collaborating within teams, resolving conflicts, and seeking assistance when necessary; (e) responsible decision-making: the ability to make ethical decisions, consider the well-being of oneself and others, take responsibility for one's actions, and realistically assess the potential consequences of those actions. This instrument is an adaptation of the "SECQ" (Zhou & Ee, 2012) into Spanish, and it has been validated by Fernández-Martín et al. (2022) to assess the different areas of competence within the Social and Emotional Learning model. The selection of this scale for the educational research is justified by its reliability and validity, as well as its suitability for administration to secondary education students, ensuring ease of comprehension. The internal consistency was assessed using Cronbach's Alpha coefficient, and the McDonald's Omega coefficient for the analyzed sample. In this study, the reliability was determined as follows: (a) self-awareness: $\alpha = .72$, $\omega = .73$; (b) social awareness: $\alpha = .64$, $\omega = .64$; (c) self-control: $\alpha = .82$, $\omega = .82$; (d) relationship skills: $\alpha = .75$, $\omega = .77$; (e) responsible decision-making: $\alpha = .69$, $\omega = .70$.

Spanish adaptation of the Life Satisfaction Scale (Núñez et al., 2010). It is a Likert-type scale consisting of 5 estimation items, each scored on a scale of 1 to 7 (i.e., 1 = *Do not agree at all*; 2 = *Disagree*; 3 = *Slightly disagree*; 4 = *Neither agree nor disagree*; 5 = *Slightly agree*; 6 = *Agree*; 7 = *Strongly agree*). This scale computes an overall score for each participant by averaging their responses to its items. This scale was selected because it is specifically designed to assess the subjective well-being or life satisfaction of adolescents and young adults. Moreover, the internal consistency was assessed using Cronbach's Alpha coefficient, and the McDonald's Omega coefficient for the analyzed sample. The reliability was determined as follows: $\alpha = .82$, $\omega = .83$.

Procedure

This study employed a descriptive, correlational, and cross-sectional predictive methodological research design (Ato et al., 2013). The investigation was carried out in accordance with the ethical standards and received approval from the Ethics Committee of the University of Granada (1736/CEIH/2020).

The data collection process encompassed several phases. Initially, high schools ($n = 8$) from Granada were informed

about the study and invited to participate on a voluntary basis. Following the acquisition of the requisite institutional permissions, contact was established with those high schools whose principals expressed interest ($n = 5$). These interested high schools formally signed a consent form, and parents were duly informed about the study's objectives and voluntary nature. All students were eligible for participation in the study if they were currently in any of the compulsory secondary school grades and their families had given their consent.

Subsequently, a member of the research team dedicated one day to visit each school and distribute the questionnaires to the participants within their respective class groups. The questionnaires were collectively administered to the formed sample during regular school hours by the principal investigator and fellow researchers in June 2023. Participants were fully informed about the study procedure, with special emphasis on its voluntary and anonymous nature. The questionnaires were distributed in stages. Initially, participants provided sociodemographic information, including their sex and age. Next, they completed the *Life Satisfaction Scale* (Núñez et al., 2010) and the *Social and Emotional Learning Scale* (Fernández-Martín et al., 2022) within 40 minutes.

The minimum sample size needed for the analyses was previously calculated ($n = 102$), considering the probability level (0.05), the anticipated effects size (0.15), and the desired statistical power level (0.8) (Soper, 2022).

Data analysis

Firstly, a descriptive analysis of the data collected was conducted, including an examination of its distribution through the Kolmogorov-Smirnov test, as well as an assessment of the presence of atypical cases, missing data, and influential cases. Secondly, to assess potential differences in social and emotional competencies and life satisfaction based on gender (hypothesis

1 and 3) and age (hypothesis 2 and 4), it was conducted the Mann-Whitney U test for two independent samples (hypotheses 1 and 3), and the Kruskal-Wallis H test for independent samples (hypothesis 2 and 4). Given that age is a quantitative variable, it was treated as a scalar variable to facilitate analyses and assess differences between group means. Finally, the Spearman's correlation analysis (Spearman's r) was conducted to examine the relationships between various quantitative variables in the study (hypothesis 5).

Statistical analysis of data was performed using the Statistical Package for Social Sciences (SPSS) v28 (IBM Corp., Armonk, NY, USA), and JASP v0.11.1 (The JASP Team, Amsterdam, The Netherlands).

Results

Firstly, the mean, the standard deviation and the results of the Kolmogorov-Smirnov test are presented in Table 1 and Table 2. The analysis revealed the absence of outliers, influential cases, and missing data, along with a non-normal distribution within the sample. Due to the statistically significant results of the Kolmogorov-Smirnov test, nonparametric statistical analyses were employed to examine the relationship between the study variables.

Secondly, the Kruskal-Wallis H test for independent samples and the Mann-Whitney U test for two independent samples revealed statistically significant differences in social awareness and self-control based on gender (Table 3). In particular, males scored higher in self-control, whereas females achieved higher mean scores in social awareness. Furthermore, no statistically significant differences were found according to age.

Finally, the Spearman's correlation analysis (Spearman's r) showed statistically significant correlations between life satisfaction, each of the social and emotional competencies, and academic performance (Table 4). In addition, all of the social and emotional variables were related to academic performance.

Table 1

Descriptive results of the research variables based on gender

Variables	Group	<i>M</i>	<i>SD</i>	K-S
Self-awareness	Male	3.09	0.57	.09***
	Female	3.07	0.61	
Social awareness	Male	2.89	0.6	.08***
	Female	3.01	0.57	
Self-control	Male	3.06	0.56	.05***
	Female	2.97	0.58	
Relationship skills	Male	3.14	0.58	.1***
	Female	3.15	0.54	
Responsible decision-making	Male	2.81	0.62	.07***
	Female	2.81	0.59	
Life satisfaction	Male	3	0.46	.04***
	Female	3	0.45	

Note. K-S = Kolmogorov-Smirnov.

*** $p < .001$.

Discussion

The aim of this educational research is to evaluate the socioemotional competencies of adolescents after the pandemic and examine their relationship with life satisfaction and academic performance. Therefore, the hypotheses established were the following: (1) girls will show a higher level of social awareness and responsible decision-making, while boys will show a higher level of self-control; (2) there will be no statistically significant differences in social and emotional competencies according to age; (3) boys will show a higher level of life satisfaction; (4) younger adolescents will have higher level of life satisfaction than older adolescents; and (5) the level of social and emotional competencies will be positively related to life satisfaction and

academic performance. Taking into consideration the results, the conclusions of the study are as follows.

The first hypothesis is partially accepted. Girls did not score higher on responsible decision-making compared to boys. However, girls did score higher on social awareness, while boys scored higher on self-control. These results are in line with other previously published research (Portela-Pino et al., 2021; Salavera et al., 2019; Zych et al., 2018). Boys usually have more abilities than girls to manage their own emotions (Portela-Pino et al., 2021) and girls tend to exhibit a higher capacity for empathizing with others and comprehending social and ethical norms (Portela-Pino et al., 2021; Zych et al., 2018).

The second hypothesis is accepted. In this case, it is worth noting that research outcomes can exhibit variability across

Table 2

Means and standard deviation of the research variables based on age

Variables	12	13	14	15	16	17	18
Self-awareness	3.24 (0.50)	3.06 (.6)	3.05 (.53)	3.12 (.64)	3.04 (.57)	3.09 (.58)	3.04 (.61)
Social awareness	3.02 (0.49)	2.96 (.71)	3.03 (.55)	3.01 (.59)	2.9 (.59)	2.89 (.58)	2.98 (.59)
Self-control	3.01 (0.50)	2.99 (.63)	2.99 (.6)	3.08 (.59)	2.98 (.55)	3.02 (.57)	3.03 (.57)
Relationship skills	3.29 (0.49)	3.19 (.62)	3.27 (.51)	3.15 (.6)	3.11 (.52)	3.11 (.58)	3.16 (.61)
Responsible decision-making	2.95 (0.59)	2.85 (.63)	2.81 (.57)	2.82 (.62)	2.76 (.60)	2.79 (.62)	2.84 (.59)
Life satisfaction	3.11 (0.39)	3.01 (.52)	3.03 (.38)	3.04 (.48)	2.96 (.43)	2.98 (.46)	3.01 (.47)

Table 3

Means and standard deviation of the research variables based on age

Variables	Age H (df)	Sex U (Z)
Self-awareness	9.01 (6)	196970 (-0.12)
Social awareness	10.71 (6)	173396** (-3.55)
Self-control	5.62 (6)	213568.5**(-2.7)
Relationship skills	10.63 (6)	194719.5 (-0.23)
Responsible decision-making	5.84 (6)	195327.5 (-0.14)
Life satisfaction	8.94 (6)	19514 (-0.15)

Note. H = Kruskal-Wallis H test; U = Mann-Whitney U test; Df = degrees of freedom; Z = Z statistic.
** $p < .01$.

Table 4

Results of the bivariate correlations between social and emotional competencies and life satisfaction

Variables	1	2	3	4	5	6
1. Self-awareness	-					
2. Social awareness	.37***	-				
3. Self-control	.68***	.39***	-			
4. Relationship skills	.55***	.47***	.56***	-		
5. Responsible decision-making	.45***	.40***	.52***	.54***	-	
6. Life satisfaction	.79***	.67***	.81***	.79***	.75***	-
7. Academic performance	.84***	.72***	.85***	.64***	.56***	.94***

Note. All correlations were estadistically significant at $p < .00$

different studies may show variability between different studies depending on the population selected. While certain studies may indicate an increase in social and emotional competencies with age (Aguilar et al., 2019; Portela-Pino et al., 2021), others may not identify the same trend (Fernández-Martín et al., 2022). These discrepancies may be due to various factors, such as the assessment instrument used, cultural context, or sample size.

The third and the fourth hypothesis are rejected as there were no statistically significant differences found in the level of life satisfaction based on gender and age. Hence, the findings of this study contradict those presented in other research (Álvarez et al., 2017; Branquinho et al., 2023). This divergence in results could be attributed to participant characteristics and uncontrolled variables within the scope of this study.

Finally, the fifth hypothesis is accepted, as the results demonstrated a strong positive correlation between all social and emotional competencies, life satisfaction, and academic performance. This study's contribution aligns with the findings of Branquinho et al. (2023) and Turan (2021), reinforcing the connection between social and emotional competencies and life satisfaction. They also align with the studies of Corcoran et al. (2018) and Mira-Galvañ & Gilar-Corbi (2020), supporting the correlation between social and emotional competencies and academic achievement. Additionally, the results are in line with Ng et al. (2015), who emphasized the relationship between life satisfaction and academic achievement. Therefore, enhancing social and emotional competencies may lead individuals to make a more positive assessment of their circumstances, improving their academic performance and ultimately enhancing their well-being.

The findings of this research have valuable theoretical implications, as they are in line with perspectives linking social and emotional learning to life satisfaction and academic performance. Individuals with a higher level of social and emotional competencies exhibit enhanced abilities to comprehend the actions and emotions of others, allowing them to form more accurate assessments of their surroundings. Consequently, these individuals adeptly regulate and handle their own emotions, leading to more frequent experiences of positive emotions. This, in turn, contributes to their overall life satisfaction.

From a practical point of view, it is imperative to design and execute intervention programs focused on social and emotional learning with the aim of enhancing academic performance and life satisfaction. This becomes particularly crucial in the ongoing post-pandemic scenario, given the adverse impact it has had on the social and emotional competencies of adolescents. While most educational efforts have traditionally concentrated on improving academic performance through cognitive and pedagogical means, this research emphasizes the crucial role of non-cognitive skills in adolescents. Thus, social and emotional competencies serve as a conduit to facilitate and enhance the learning experience and overall well-being of young individuals, a necessity that has become more apparent in the current educational landscape.

While the significance of social and emotional competencies is gaining prominence in the field of education, there is still much work to be done to ensure their proper integration and

assessment. Specifically, in Spain there is currently no comprehensive model that incorporates these competencies into the curriculum (Resurrección et al., 2021), resulting in their incomplete integration into school dynamics.

This is the first study that explore the connections among these three constructs within the academic context. Hence, this study contributes to the expansion of our understanding of the factors influencing social and emotional learning and its relationship with life satisfaction and academic performance.

Despite the valuable insights that this study offers, it is of the utmost importance to carefully interpret the results because of the study's limitations. Firstly, the absence of an experimental or quasi-experimental design does not allow us to generalize the results and establish causal relationships. Secondly, although the instruments employed in this study have been widely used in previous research, it is important to acknowledge that the use of self-reports may introduce certain biases. Thirdly, the sample included 1,270 secondary school students from the same province, Granada. Therefore, the results cannot be generalized to other contexts.

Therefore, future research should employ experimental or quasi-experimental designs and longitudinal research methods to investigate the causal effects of social and emotional competencies on life satisfaction. Additionally, forthcoming studies should consider variables like the leisure activities engaged in by students, levels of resilience, stress, family background, etc., to gain a more comprehensive understanding of these factors. Also, it would be necessary to expand the sample to include diverse backgrounds and contexts to enhance the generalizability of findings.

The findings of this study hold significant importance as they contribute to our understanding of the factors impacting the well-being of adolescents. It underscores the significance of social and emotional skills and their correlation with life satisfaction and academic performance. Hence, in the current post-pandemic era, there is an even greater urgency to design and implement high-quality interventions centered around social and emotional learning in education, particularly from an early age.

Author contributions

Conceptualization: P.A.S.
 Data curation: P.A.S.
 Formal analysis: P.A.S.
 Funding acquisition: F.D.F.M.
 Investigation: F.D.F.M.
 Methodology: P.A.S., F.D.F.M.
 Project administration: F.D.F.M.
 Resources: F.D.F.M.
 Software: P.A.S.
 Supervision: F.D.F.M.
 Validation: F.D.F.M.
 Visualization: P.A.S., F.D.F.M.
 Writing – original draft: P.A.S.
 Writing – review & editing: P.A.S.

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Declaration of interests

The authors declare that there is no conflict of interest.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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