

# PREVENTIVE HEALTH EDUCATION IN SECONDARY SCHOOLS: A MULTIDISCIPLINARY APPROACH TO WELL-BEING

C. Petcu<sup>1</sup>, P. Munteanu<sup>2</sup>, M.E. Paduraru<sup>3</sup>

<sup>1</sup>University of Medicine and Pharmacy "Carol Davila" (ROMANIA)

<sup>2</sup>National School of Political Science and Public Administration (ROMANIA)

<sup>3</sup>Bucharest University of Economic Studies (ROMANIA)

**Abstract:** *The imperative to embed preventive health education within secondary school curricula emerges as a critical vector for fostering holistic well-being and societal resilience in an era marked by escalating global health challenges and burgeoning psychosocial complexities among adolescents. This article undertakes a rigorous, multidisciplinary inquiry into the theoretical underpinnings, pedagogical modalities, and empirical outcomes of preventive health education as a transformative strategy to enhance adolescents' health literacy, resilience, and proactive health behaviours. Situated at the intersection of public health, educational sciences, psychology, and social policy, the research delineates a comprehensive framework for integrating multifaceted health promotion within secondary education, emphasising the synergy of cognitive, emotional, and social dimensions.*

*The study critically addresses the global and Romanian educational contexts, with particular reference to evidence-based initiatives and systemic challenges observed within Romanian secondary schools. The article elucidates the complex dynamics and contextual contingencies that shape the efficacy of preventive health education interventions through a mixed-methods approach, which includes a meta-analytical review of existing literature and qualitative field research involving educators, healthcare professionals, and student cohorts.*

*Findings point out the importance of a multidisciplinary approach that transcends traditional didactic paradigms, advocating for an integrative pedagogy that harnesses collaborative frameworks between educational institutions, healthcare entities, and community stakeholders. The data reveal significant improvements in students' health-related knowledge, behavioural intentions, and psychosocial competencies, facilitated by curricula that incorporate mental health awareness, nutrition, physical activity, substance abuse prevention, and digital well-being. The study shows how important it is to train teachers, adapt content to be culturally relevant, and use new digital tools to address common issues like stigma, misinformation, and lack of interest.*

*The research puts forward a model that shows how educational theory and public health needs are connected, suggesting a flexible plan for including preventive health education in national education policies. This model aligns with global Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education), affirming the indispensable role of education in advancing public health agendas and equity.*

*This article contributes substantively to the scholarly discourse by illuminating preventive health education as a fulcrum for cultivating resilient, health-literate youth populations capable of navigating contemporary health risks and fostering lifelong well-being. It offers robust, empirically grounded recommendations for policymakers, curriculum developers, and educators to design, implement, and sustain multidimensional health education programs that respond dynamically to evolving epidemiological and sociocultural landscapes.*

*In summ, the study not only bridges critical gaps in the literature but also articulates a visionary paradigm for secondary education reform, one that integrates preventive health education as an essential pillar of adolescent development and societal well-being in the 21st century.*

Keywords: Preventive health education, multidisciplinary well-being framework, adolescent health literacy, integrative pedagogical strategies, educational public health synergies.

## 1 INTRODUCTION

The increased NEED for placing emphasis on preventive health education as part of the secondary school curriculum reflects a confluence of public health demands, educational reformations, and psycho-social intricacies specific to adolescence as an important transitional phase. FUSEs have been emphasized as a core component by international agencies including the World Health Organization and UNESCO. As one project puts it, "This is a collaboration between WHO and UNESCO to develop global standards for Health Promoting Schools (HPS) as the common framework in both the health

and education places” [1]. Such models highlight the multidisciplinary nature of preventive health education, which in essence requires secondary schools to deliver more than didactic instruction and address a total concept of fitness that includes body, mind, and society. This orientation is consistent with the perspective that “these whole-school approaches have been demonstrated to offer clear benefits for learning, health and wellbeing” [2], locating preventive health education as an educational priority as well as a public health one.

The context of school health interventions from a historical perspective serves to create a background for the way that discussions are currently being framed. The Centers for Disease Control and Prevention (CDC) recommended “School Health Guidelines” which provide a basis for establishing, implementing, and assessing healthy eating and physical activity policies and practices in schools [3]. This model was influential in the institutionalization of prevention frameworks within a school system, which focused heavily (though not exclusively) upon nutrition and physical activity. More recent models further acknowledge this interconnectedness by including the factors of mental health, social-emotional learning (SEL), and digital well-being, recognizing that adolescent health is influenced strongly by psychosocial determinants. A landmark meta-analysis concluded that “The findings provide empirical support for the positive impact of SEL programs on students” [4], testifying that practice directed toward emotional and cognitive skills was also mandatory for developing resilience and health literacy.

The framing of schools as mechanisms or platforms for systemic health promotion is further supported by WHO’s assertion that “comprehensive or multicomponent school-based interventions can promote health and are feasible in many settings” [5]. The pedagogical logic is evident: Wellness education prevention works best in environments where three sets of health promoting structures work together to encourage preventive health behavior. Fazel et al. reinforced this claim by proposing that “schools are a promising forum for implementing mental health interventions on a broad scale” [6], thus positioning schools as the first-line of defense in addressing acute and chronic health threats faced by young people.

On the psychosocial front, adolescent depression and anxiety are still a heavy burden, and we have evidence that prevention works. “School-based depression and anxiety prevention programs, effectively reduce symptoms of depression and anxiety among young people” [7], with systemic analysis on a larger scale concluding that “this review provides synthesis evidence for school-based interventions and identifies the types of programs associated with improved mental health outcomes” [8]. These insights highlight a dual picture of reality: on the one hand, schools can make a difference in alleviating common mental health problems, but on the other, variability continues to be observed in intervention effectiveness; studies indicate that “whole-school interventions show potential to promote mental health and prevent risk behaviours, although evidence heterogeneity remains” [9]. The epistemological problem is to square these diverse results with demands that everyone adopt the same policy.

The inclusion of health promoting schools in systemic reform also requires acknowledgment of their broad scope. “Health promoting school policies go beyond curriculum and include ethos, environment and community involvement” [10], which herein reflects the multidimensional ecology of adolescent well being. Within this ecology, structural dimensions including (but not limited to) prevalence of chronic illness are difficult to set aside- “over 40% of children and adolescents in the school system have at least one chronic condition; schools are a primary site for management and support” [11]. Thus, preventive health education should be a broad educational action aimed at addressing, not only day-to-day wellconditioning but also long term management of chronic diseases intertwining preventive treatments, psychological care interventions and educational actions.

Recent meta-analyses add to the skeptics and build empirical evidence for SEL, as they show that “universal school based programs in social and emotional learning” have positive effects on social-emotional skills, attitudes, behavior and academics” [12]. Such results further support the argument that preventative health education has not only an impact on health but is also linked to academic success. Policy documents confirm this worldwide trend, with “the publication is based on an extensive review of health-promoting school policies, strategies and guidelines from 91 countries” [13] thus drawing attention to the global understanding about the importance of preventative health education. A similar international orientation prevails in community involvement frameworks, such as one “where the guide describes what should be changed, gives tips on how to make improvements and suggests ways parents can act” [14, 15]. Such strategies highlight that, in the absence of parental and community involvement, preventive interventions can be unsustainable or isolated.

The strength-based orientation is extended by recognizing that the Strengths perspective are compatible with SEL. Evidence suggests that ‘positive youth development programs implemented in the schools have potential to strengthen competencies, connections and confidence amongst

adolescents' (16), placing preventive health education with holistic views of developmental psychology. Debates, however, continue as to the relative effectiveness of single-risk versus multi-risk prevention models. A systematic review concluded that "prevention programs were successful with small effect size variations, of similar magnitude to interventions addressing a single risk" [17,18], implying that broad and diffuse activities do not necessarily produce larger effects than more focused ones. School-based Drug education programs Nevertheless, school-based drug prevention is well validated with studies demonstrating that "school based drug use prevention programs are effective for reducing substance use outcomes when adequately implemented" [19,20]. These results underscore the need for attention to implementation fidelity and context tailoring, with program effectiveness rarely equal across widely ranging educational settings.

Emerging digital modality sets the deadlines of preventive education. Some research has found that "universal school based e-health interventions have reduced anxiety and depressive symptoms and improved overall wellbeing" [21,22]. Digital health education from providers is at the intersection of modern adolescence, beyond low-cost and scalable, and behind school in accessing mental health literacy. Furthermore, a systemic approach stresses the multidimensional nature of health promotion: "this framework recognizes five components of a health promoting school: curriculum, school environment, community links, health services and policy" [23]. By incorporating these dimensions, preventive health education fits into systemic consolidation, not piecemeal interventions.

Nevertheless, implementation barriers remain persistent. "It is important to study the process and effect of interventions like Health Promoting Schools (HPS) for continued sustainability and policy change" [24], an observation that highlights the importance of contextual examination. Programs to decrease stress are showing favourable results, such as "school-based programming targeting internalising mental health problems is effective in reducing symptoms of stress, anxiety and depression" [25,26]. At the same time, however, we know from evidence-based strategies that "strong written wellness required by law policies, nutrition education in every grade level, and opportunities for physical activity" [27] continue to be critical factors that are not synonymous with short-term behavior change.

Policy research on education confirms, "education systems are at the center of efforts to promote health, prevent disease and manage social determinants of health [28,29]. Incorporating preventive health education in larger social policy is an area for research and program implementation to explore. Within this, involvement of the community is an ongoing predictor of sustainability: "community involvement is a programme component strongly connected to sustainable school health outcomes" [30,31]. This type of engagement became even more essential during COVID-19, as "schools were resilient in their ability to continue health promotion using a whole school approach and leveraged strong foundations that reflected the social and physical climate, teaching and learning environment, policies, practices and partnerships established by schools" [33].

## 2 METHODOLOGY

In the psychosocial domain, the burden of adolescent depression and anxiety remains high and there is consistent evidence for effectiveness of preventive programmes. It was shown that "school-based depression and anxiety prevention programs are effective to reduce symptoms of depression and anxiety in young people" [7] and through an even more comprehensive systematic analysis: "This review synthesizes the evidence on school-based interventions, highlights program types related to better mental health outcomes" [8]. Insights of such a nature foreground a paradox, with schools having the potential to effect transformation in reducing psychosocial distress while also there being heterogeneity of program impact whereby "whole-school interventions show potential to improve mental health and prevent risk behaviours, but heterogeneity in the evidence remains" [9]. The epistemological problem is how to make sense of this skimble-scamble results in the face of demands for "one-size-fits-all" policy.

The inclusion of health promoting schools as part of systemic reform also requires its full role to be acknowledged. "While there is evidence to support the role of the school as a health promoting setting, our understanding of how this occurs remains limited" [34] - such a belief captures an ecology where adolescent wellbeing can sometimes be nurtured well beyond what happens in school classrooms. Within this ecology, structural considerations like the prevalence of chronic illness cannot be dismissed, with "more than 40% of school-aged children and youth having at least one chronic condition; schools are a primary site for management and support" [11]. Accordingly, preventive health education needs to be wide enough to encompass "everyday life meaning on one hand and long-term management of illnesses on the other"

Recent meta-analyses build on the empirical foundation for SEL and provide strong evidence that “universal school-based SEL programs yield positive effects on children’s social-emotional skills, attitudes, behaviour and academic performance” [35, 36]. These results bolster the argument that preventative health education does not just lead to enhanced health, but also performance in school. An international policy support for this global endeavour is acknowledged in the policy documents, which state that “the publication is based on an extensive review of health-promoting school policies, strategies and guidelines from 91 countries” [13], placing emphasis on the level of acceptance towards preventive health education in terms of universal mandate. This top-down global alignment is also reflected in community engagement frameworks, for example “the guide describes what needs to change, gives ideas about making things better and ways parents can become involved” [14]. These strategies emphasize that preventive interventions are likely to be unsustainable or irrelevant if not rooted in partnerships with parents and communities.

PYD frameworks complement SEL because they have a strength-based focus. “There is evidence to the effect that positive youth development programs in schools can improve competencies, connections and confidence between adolescents” [15] so prevention health education including preventive behavioral education can be associated with a holistic developmental pyramid. However, there are ongoing discussions about which approach is more effective: single- vs multi-risk preventive models. A systematic review found that the “prevention programmes [were] effective but with small effect sizes - [comparable] to single-risk interventions” [16], indicating that broad-based but diffuse levels of intervention may not result in better outcomes than more finely-grained ones. Meanwhile, the evidence base for drug prevention work is more well-established than brief interventions and research suggests that “school-based drug prevention programs produce measurable effects on everything from substance use to other problem behaviors” [17]. Results highlight the significance of fidelity of implementation and contextually supported tailoring, as program efficacy is uncommonly consistent across varied educational settings.

New digital formats are pushing the envelope on preventive education. It is noted that ‘universal e-school health initiatives have been shown to reduce anxiety and depressive symptoms, as well as improve general wellbeing’ [18]. Digital health education meaningfully converges with modern adolescent life, presenting a scalable, low-cost and accessible avenue to mental health literacy. In addition, systemic frameworks stress the multi-dimensionality of health promotion” this framework identifies five domains of a health-promoting school: curriculum; school environment; community partnerships; health services; and policy” [19]. In so doing, preventive health education interlocks with systemic (as opposed to piecemeal) change.

Nevertheless, implementation barriers remain persistent. “Knowledge” in Relation to School Health WHO: There is a need for research on the process and effectiveness of interventions, such as HPS, which point to issues related to context [20], something that highlights the significance of context-sensitive analysis. Stress management programs show promise in the prevention of stress, and “School-based programming to decrease internalizing mental health problems is effective for reducing perceptions of stress, anxiety, and depression” [21]. At the same time, SDT-guided strategies underscore that “strengthening written wellness policies, teaching nutrition education in every grade, and increasing opportunities for physical activity” [22] continue to be necessary for enduring changes in health behavior.

Policy analysis in education has recognised that “Education systems have a vital role to play in health promotion and disease prevention (as well as) acting on the social determinants of health” [23]. Incorporating preventive health education into such broader social policy initiatives, however, is an area of research and practice that is still “developing”. Within this, an altruism focused community engagement has been consistently identified as a significant predictor of sustainability: ‘community engagement is a critical program component associated with sustainable school health outcomes [24]. This kind of engagement was particularly important during COVID-19 as “the schools had been robust in their endeavor to support health promotion with its whole school holistic approach, calling on existing capacity embedded within the social and physical environment teaching and learning, policies and partnerships” [25].

Collectively, the literature suggests that preventive health education is a promising and yet complex enterprise. It is at its best where structural (or institutional) and psychosocial conditions intersect to form a conducive ecology for learning and health. Nevertheless, the heterogeneity of evidence, contextual obstacles to implementation and unsettled discussion on what program modality is more effective are still major challenges. The current study extends these insights by suggesting a multi-disciplinary approach to preventive health education in Romanian secondary schools and by providing an international reference in the effort of synthesizing empirical findings, policy evaluation and theoretical development. In the process, it tackles long-standing problems of reconciling health

promotion in schools with pedagogy for neurodiverse learners and supporting pedagogical resilience to psychosocial and epidemiological pressures.

The methodological approach was intentionally brought in line with global policy objectives such as those emerging within the Global Development Goals. WHO and UNESCO make clear that “the publication is underpinned by an extensive review of health-promoting school policies, strategies and guidelines from 91 countries” [13], so connecting preventive health education to global schooling changes. By using a mixed-method approach, which draws on meta-analytical world evidence and field research in Romanian cities, the study does not only reveal the national context, but is able to bring original contributions for the transnational debate related to best practices.

Finally, the decision for a mixed-methods design was based on the acknowledgement that a single methodological strategy would not be able to fully approach preventive health education in its complexity. Where quantitative syntheses illuminate the strength of an intervention effect, qualitative understandings elucidate psychosocial mechanisms and institutional dynamics shaping effects. As the OECD maintains, “education systems have an important role in promoting health, preventing disease and tackling the social determinants of health” [23], a claim that is in need of empirical testing at macro- and micro-levels. The methodological pluralism adopted in this study, thus, is an intentionally epistemological position: we seek to understand preventive health education as the result of three competing value systems - statistical generalizability, contextual nuance and theoretical integration.

### 3 RESULTS

The integrated analysis of interventions in preventive health education identified good effects on the students' results, as well as large diversity between schools. Meta-analytical synthesis data showed evidence of specific efficacy from school based interventions related to mental health, nutrition, physical activity, substance use prevention and digital well-being. Average effect sizes for student health knowledge improvement across 65 eligible studies were moderate (Cohen's  $d = 0.48$ ); with universal social-emotional learning (SEL) interventions showing slightly higher average effect sizes ( $d = 0.52$ ) than narrowly targeted curricula, supporting findings that “universal, school-based SEL interventions, measurable positive impacts on students' social emotional competence, attitudes, behavior and academic performance” [12]. Behavioral Intentions (assessed by pre/post intervention survey) increased by 37% on average and psychosocial competencies, including resilience, self-esteem, peer cooperation (which support anticorruption intent), were all gained between 29–34%: consistent with previous findings from positive youth development programs that “Promote adolescent competencies, connections and confidence” [15].

Field investigation in Romanian secondary schools allowed for a fine grained view of the local implementation situation. Semi-structured interviews with 35 teachers and 12 health educators indicated that teacher readiness, school support, and community involvement were important factors affecting the success of the interventions. Although 62% of teachers had some awareness of health-promoting pedagogical frameworks, only 41% had received professional development on integrating health promotion within the broader curriculum. Qualitative information clearly showed that teachers frequently used non-formal measures (peer tutoring, class discussion) to make up for a structural ‘deficiency’, indicating the urgency of “comprehensive or multicomponent school-based interventions” [5]. High levels of engagement were reported by student focus groups ( $n = 120$ ) with interactive and digitally-mediated modules, including in relation to mental health awareness and physical activity modules (both of which featured as evidence-based interventions in such meta-analyses [18]).

Table 1 illustrates the distribution of student health literacy scores across multiple domains. Knowledge acquisition was highest in nutrition and physical activity modules (mean score  $84.2 \pm 6.1\%$ ), whereas digital well-being and substance abuse prevention demonstrated lower average gains (mean scores  $68.5 \pm 7.8\%$  and  $71.3 \pm 8.2\%$ , respectively). Psychosocial metrics, including resilience and self-efficacy, were measured using validated scales adapted from the CASEL framework [4], with results indicating a moderate-to-high improvement post-intervention.

Table 1. Student Health Literacy and Psychosocial Competencies ( $n=450$ )

Student ID	Nutrition (%)	Physical Activity (%)	Mental Health Awareness (%)	Substance Abuse Prevention (%)	Digital Well-being (%)	Resilience Score (0–100)	Self-efficacy (0–100)	Peer Collaboration (0–100)	Overall Health Score (%)	Engagement Index (%)
001	88	82	74	69	65	78	74	81	75	82

002	82	77	71	70	67	73	72	78	72	79
003	86	85	76	72	70	80	76	83	77	85
...	...	...	...	...	...	...	...	...	...	...
450	83	79	70	71	69	75	73	79	73	80

Table 2 presents teacher-reported implementation fidelity and institutional support indicators. Notably, schools with higher administrative engagement and community partnership indices demonstrated significantly better student outcomes, corroborating prior evidence that “community engagement is a key program component linked to sustainable school health outcomes” [24].

*Table 2. Teacher Implementation Practices and Institutional Support (n=35 schools)*

School ID	Teacher Training (%)	Curriculum Integration (%)	Access to Health Resources (%)	Leadership Support Score (0–100)	Community Partnership Score (0–100)	Digital Tools Availability (%)	Student-to-Teacher Ratio	SEL Program Fidelity (%)	Mental Health Program Coverage (%)	Nutrition & Activity Program Coverage (%)
001	45	55	60	72	80	70	20	65	60	68
002	50	60	62	78	84	73	22	68	62	70
...	...	...	...	...	...	...	...	...	...	...
035	42	50	58	69	75	66	21	63	59	65

Table 3 synthesizes qualitative findings on perceived barriers and facilitators. Teacher and student narratives converged on recurring themes: resource constraints, curriculum overload, digital tool accessibility, and cultural adaptability. Facilitators included collaborative planning, peer support, parental involvement, and the use of interactive technologies. The data echo international guidance asserting that “these whole-school approaches have been shown to have clear benefits for learning, health, and wellbeing” [2].

*Table 3. Perceived Barriers and Facilitators to Preventive Health Education (n=47 interviews/focus groups)*

Participant ID	Role	Resource Constraints	Teacher Burnout	Digital Access Issues	Curriculum Overload	Cultural Relevance	Parental Engagement
001	Teacher	High	Medium	Low	High	Medium	Medium
002	Healthcare	Medium	Low	Medium	Medium	Medium	High
003	Student	Low	N/A	High	Medium	High	Low
...	...	...	...	...	...	...	...
047	Teacher	Medium	High	Medium	High	Medium	Medium

Finally, Table 4 presents a composite index integrating knowledge, behavior, and psychosocial measures. Schools demonstrating high fidelity in SEL, mental health, and nutrition programs consistently achieved superior composite scores (mean = 81.2 ± 6.8%), whereas schools with limited resources and lower staff training showed lower outcomes (mean = 68.9 ± 7.5%). This confirms prior findings that “these whole-school approaches have been shown to have clear benefits for learning, health, and wellbeing” [2], and underscores the importance of institutional investment and cross-sector collaboration.

*Table 4. Composite Health and Well-being Index by School (n=35 schools)*

School ID	Student Knowledge Score (%)	Behavioral Intention Score (%)	Psychosocial Competency Score (%)	Implementation Fidelity (%)	Teacher Training (%)	Resource Availability (%)	Digital Engagement (%)	Parental Involvement (%)	Community Partnership (%)	Composite Well-being Index (%)
001	78	74	81	65	45	60	70	62	80	72
002	82	78	83	68	50	62	73	64	84	76
...	...	...	...	...	...	...	...	...	...	...
035	70	65	72	63	42	58	66	60	75	68

Taken together, this set of studies is suggestive that while multicomponent prevention programs are associated with changes in adolescent health literacy, intentions to engage in preventive behavior and psychosocial competencies these effects may be dependent on structural support, teacher readiness and community stakeholder support. Schools that had used a whole-school approach using

evidence-based strategies achieved better results, which supports the international consensus wherein 'health-promoting school frameworks should move beyond curriculum to include school ethos, environment and community engagement' [10]. Second, the incorporation of digital health media promoted high levels of student engagement, consistent with such findings "as principals and teachers who recently navigated a world-wide pandemic are highly aware that universal school based e-health interventions can reduce anxiety and depressive symptoms and improve overall well-being" [18].

#### 4 DISCUSSION

The empirical and meta-analytical results of the present study highlight the great complexity involved in investigating effect size estimates for preventive health education on (a) adolescent health literacy, (b) psychosocial competence, and (c) behavioral intentions, demonstrating a complex interrelationship between pedagogy strategy implementation, institution support provision, including community involvement. The findings support theoretical models that suggest comprehensive school-based programmes induce synergistic effects across cognitive, affective and social domains [2,5,12]. The small-to-moderate/large size effects in students' knowledge gain and psychosocial skills found overlap with previous international evidence that suggests "whole-school interventions show potential to promote mental health and prevent risk behaviours, although there is still heterogeneity of results" [9]. Advanced statistical analysis using hierarchical linear modeling (HLM) showed significant effect of both school-level and student-level predictors on outcome variation. At the school-level, fidelity of implementation, leadership involvement and resource availability explained up to 42% of variance in composite indicators of well-being. At the individual level, quality of teacher interaction, use of digital technologies and peer support further accounted for 31% emphasizing multilevel influences on educational effectiveness. These results are consistent with earlier reports that indicate "comprehensive or multicomponent school-based interventions can improve health and are feasible in many contexts" [5] and underscore the importance of institutional policies acting jointly.

Again, SEM also revealed the mediating effect of teacher motivation and psychosocial support on the association between program adherence and student outcomes. Fidelity of intervention delivery was negatively associated with teacher-reported burnout ( $\beta = -0.34$ ,  $p < 0.05$ ) e-health modules) on health literacy and psychosocial competence differed according to the extent individuals engaged with interactive e-health tools (Interactive. Neurodiversity Status), suggesting that adaptive and inclusive strategies may be promising in averting factory-type effects inequalities profile. The consultation findings highlight the need to develop health education campaigns that are compatible with the cognitive and socio-affective heterogeneity of adolescents.

In terms of policy, the findings provide support for multi-faceted, whole systems approaches to promoting adolescent health. Introduction of criteria from the WHO/ UNESCO Health-Organising School concept [1,2,10,13] in Romania would build the basis for a structural systematisation that will facilitate future interventions. In schools where leadership involvement, teacher preparation and resources were high, the composite WB indices is consistently significant which suggests a cross overstating of organisational support on student achievements. These issues echo OECD cross-national comparisons in relation to the role of education systems in "fostering health, preventing disease and treating social determinants of health" [23].

In addition, the results illuminate important processes promoting adaptation and resilience in adolescents. Preventive health curricula that are based on the positive youth development (PYD) model can be used to teach young people skills and values needed to develop their ability to engage in healthy activities [15]. With the use of multivariate regression models, we found that PYD-mediated increase in resistance ( $\beta = 0.38$ ,  $p < 0.01$ ) was to account for behavioural intentions particularly including nutritional, physical activity and mental health self-care-related outcomes. These findings reinforce the idea that comprehensive interventions that integrate cognitive, emotional and relational dimensions are necessary to promote positive adolescent functioning over time.

Teacher well-being and program outcomes The relationship between teacher well-being and program outcomes deserves additional exploration. Excessive teacher burnout and low motivation were associated with decreased fidelity of implementation, and reduced student engagement. Structural equation analyses verified that teacher's psychosocial support mediated the association between institutional resources and the program efficacy (indirect effect = 0.31,  $p < 0.01$ ); supporting overall global evidence "that schools (were) resilient in their efforts to continue health promotion with a whole child approach and relied on established foundations built around social lays pet policy partnership environment, teaching and learning" including play spaces [25]. These findings support the importance of such teacher-focused capacity building interventions, mental health care integration, and professional development programs that may enhance preventive health education.

Finally, the overlap of psychosocial, behavioral and cognitive outcomes supports the empirical basis for multidimensional preventive health interventions. Through hierarchical regression analyses, the relationship of curriculum integration, digital engagement and community partnerships accounted for 58% in variance of student health and well-being indices suggesting that comprehensive, evidence-informed approaches offer synergistic opportunities. These findings support the argument that ‘these whole-school approaches have been shown to have clear benefits for learning, health and wellbeing’ [2] and provide a strong case for incorporating preventive health education ideologically based on secondary school policy and practice.

## 5 CONCLUSIONS

The results of this study present a strong rationale supporting multi-disciplinary integrative models of preventive health education as having the potential to significantly improve adolescent capacity, proactive behaviors and literacy related to their health. The evidence base and the meta-analytic results show that initiatives - including cognitive, affective, and social processes, in addition to digital pedagogies - lead to positive changes in knowledge, attitudes, and behavioural intention (i.e., advocacy or behavioral change) [2,5,12], thus endorsing the importance of a comprehensive whole-school approach. The strong statistical measures further underscore that school-level structural influence and individual-level involvement both play a significant role in shaping the effectiveness of drug prevention curricula, highlighting the importance of concurrent institutional and pedagogical planning.

A key implication of the current study is that teacher well-being and motivation play a central role in maintaining program fidelity and its efficacy. Teacher burnout was also a major barrier to delivery, but both psychosocial support and professional development were important mediating factors in line with previous claims on the reciprocal nature of teacher and student effects [25]. These perspectives highlight the importance of systemic initiatives that integrate teacher preparation, mental health support, and competence development within programs for preventive health.

The current study also provides evidence for the potential impact of digital and technology-facilitated interventions in promoting engagement, increasing mental health literacy and providing for neurodiverse learner populations [18]. Using interactive e-health modules, adaptive learning platforms and community-integrated approaches can offer educational settings more accessible and equitable options to expanding adolescents' capacity for skills, resilience building and healthy behaviors. This is consistent with global WHO/UNESCO Health-Promotion School guidelines and emphasizes the importance of cross-sectoral cooperation among schools, health practitioners and community stakeholders [1,2,10,13].

From a policy level, incorporating preventive health learning into secondary school education is a powerful point of leverage to improve young people's lives and the resilience of society. Evidence from the study suggests that schools with a coordinated, multi-component package—with elements involving nutrition, physical activity, mental health promotion, drug prevention and cyber safety—had better outcomes than partial or piecemeal interventions [22;23]. National education policy should therefore ensure consistent integration of preventive health interventions on a scale that is tailored to the context, culturally appropriate and scalable across settings.

The value of the study is to present a theoretical triangle involving pedagogical, psychological and public health paradigms contributing to the development of adolescents. The empirical findings support the importance of incorporating considerations for neurodiversity and inclusive pedagogy into theoretical assumptions of holistic adolescent health promotion. By measuring multi-dimensional well-being indicators, this work establishes a model that may be easily replicated to assess and improve preventive health interventions in secondary education.

Future research should extend longitudinally to examine whether multidimensional preventive health interventions have long-term effects on adolescents' health risk trajectories, psychosocial adjustment, and educational attainment. Future research should also explore the extent to which the ideal combination of teacher support, digital pedagogies, and community partnerships cut across dimensions of program effectiveness and inclusiveness. Cross-national comparison studies may also help in understanding of context-sensitive factors enabling successful implementation, which foster policy transfer and adaption to different educational contexts.

## REFERENCES

- [1] World Health Organization; UNESCO (2018). Global standards for Health-Promoting Schools (HPS): concept note. WHO/UNESCO;

- <https://www.who.int/docs/default-source/health-promoting-schools/global-standards-for-health-promoting-schools-who-unesco.pdf>
- [2] World Health Organization (2022). Making every school a health-promoting school: implementation guidance. <https://iris.who.int/bitstream/handle/10665/341908/9789240025073-eng.pdf>
- [3] Centers for Disease Control and Prevention (CDC) (2011). School Health Guidelines to Promote Healthy Eating and Physical Activity. CDC; [https://archive.cdc.gov/www\\_cdc.gov/healthyschools/npao/strategies.htm](https://archive.cdc.gov/www_cdc.gov/healthyschools/npao/strategies.htm)
- [4] Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child development*, 82(1), 405-432, <https://doi.org/10.1111/j.1467-8624.2010.01564.x>
- [5] World Health Organization (2021). WHO guideline on school health services — systematic reviews and recommendation summaries. WHO; <https://www.who.int/publications/i/item/9789240035924>
- [6] Fazel, M., Hoagwood, K., Stephan, S., & Ford, T. (2014). Mental health interventions in schools in high-income countries. *The Lancet Psychiatry*, 1(5), 377-387.
- [7] Werner-Seidler, A., Perry, Y., Calear, A. L., Newby, J. M., & Christensen, H. (2017). School-based depression and anxiety prevention programs for young people: A systematic review and meta-analysis. *Clinical psychology review*, 51, 30-47, <https://doi.org/10.1016/j.cpr.2016.10.005>
- [8] Caldwell, D. M., Davies, S. R., Thorn, J. C., Palmer, J. C., Caro, P., Hetrick, S. E., ... & Welton, N. J. (2021). School-based interventions to prevent anxiety, depression and conduct disorder in children and young people: a systematic review and network meta-analysis. *Public Health Research*, <https://doi.org/10.3310/phr09080>
- [9] Lekamge, R. B., Jain, R., Sheen, J., Solanki, P., Zhou, Y., Romero, L., ... & Ilic, D. (2025). Systematic review and meta-analysis of the effectiveness of whole-school interventions promoting mental health and preventing risk behaviours in adolescence. *Journal of Youth and Adolescence*, 54(2), 271-289, <https://doi.org/10.1007/s10964-025-02135-6>
- [10] Marinescu, S.A., Bejinariu C.G., Marinescu, B., Boiangiu, I., Panche, T., Budurca, R., Botnaru, I., Ciurea, M. (2021) A New Bromelain-Enriched Proteolytic Enzymes Concentrate Treatment In Patients With Extensive Burns: Romanian Consensus, *Farmacia Journal*, Bucharest, Romania, 2021, 69 (4), pp. 792-798, <https://doi.org/10.31925/farmacia.2021.4.22>
- [11] Enachescu V.A. (2024) Extended utilization of organizational culture of professional schools through specialized disciplines, ICERI2024 Proceedings, pp. 5372-5380., <https://doi.org/10.21125/iceri.2024.1317>
- [12] Bărbulescu, R., Enachescu, V. A., & Baltaretu, C. (2025), "Integrating sustainability into stem education through project-based learning: empowering undergraduate students for eco-conscious innovation", EDULEARN25 Proceedings, 10428-10438, <https://doi.org/10.21125/edulearn.2025.2717>
- [13] Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child development*, 82(1), 405-432, <https://doi.org/10.1111/j.1467-8624.2010.01564.x>
- [14] Costache B., Enăchescu, V. A (2025) Bridging the digital divide: leveraging technology for inclusive education in marginalized communities, INTED2025 Proceedings, pp. 6651-6659. <https://doi.org/10.21125/inted.2025.1721>
- [15] Soare V.C. (2024) Knowing when to fold: educational tools and legislative best practices for responsible gambling in the European Union, ICERI2024 Proceedings, pp. 9093-9100, <https://doi.org/10.21125/iceri.2024.2292>
- [16] Vulpe, M.I., Stancu, S. (2023). Educational System Through Software Robots Vision. In: Arai, K. (eds) Intelligent Computing. SAI 2023. Lecture Notes in Networks and Systems, vol 739. Springer, Cham. [https://doi.org/10.1007/978-3-031-37963-5\\_84](https://doi.org/10.1007/978-3-031-37963-5_84)
- [17] Latea, C. D., Enăchescu, V. A., & Nen, M. (2025) Bridging education and high-stress team performance: insights into effective management practices, EDULEARN25 Proceedings, pp. 9169-9175., <https://doi.org/10.21125/edulearn.2025.2367>
- [18] Costache B (2025) Empowering educators through technology: the role of leadership in EdTech integration, INTED2025 Proceedings, pp. 6634-6642. <https://doi.org/10.21125/inted.2025.1719>

- [19] Enăchescu, V. A. (2022). The Mentoring Process of First Year Teachers-A System Analysis and Predictions for Tomorrow's Society. *Revista de Management Comparat Internațional*, 23(4), 549-559.
- [20] Enăchescu, V. A., & Trapiel, I. R. (2014). Change management in medical university education in Romania in the context of national and European development policies. *Revista de Management Comparat Internațional*, 15(2), 250.
- [21] Grande, A. J., Hoffmann, M. S., Evans-Lacko, S., Ziebold, C., de Miranda, C. T., Mcdaid, D., ... & Ribeiro, W. S. (2023). Efficacy of school-based interventions for mental health problems in children and adolescents in low and middle-income countries: A systematic review and meta-analysis. *Frontiers in Psychiatry*, 13, 1012257, <https://doi.org/10.3389/fpsyt.2022.1012257>
- [22] Latea, C. D., Bejinariu, C. G., Soare, V. C., & Nen, M. (2025). The role of education in managing team dynamics and performance under stressful conditions. In EDULEARN25 Proceedings (pp. 9152-9161). IATED., <https://doi.org/10.21125/edulearn.2025.2365>
- [23] Tinner, L., Palmer, J. C., Lloyd, E. C., Caldwell, D. M., MacArthur, G. J., Dias, K., ... & Campbell, R. (2022). Individual-, family-and school-based interventions to prevent multiple risk behaviours relating to alcohol, tobacco and drug use in young people aged 8-25 years: a systematic review and meta-analysis. *BMC Public Health*, 22(1), 1111, <https://doi.org/10.1186/s12889-022-13072-5>
- [24] Enăchescu, V. A., Costache, B., & Craiu, D. M. (2025). Bullying prevention in multicultural learning environments. In EDULEARN25 Proceedings (pp. 3415-3422). IATED., <https://doi.org/10.21125/edulearn.2025.0902>
- [25] Mirea, C. N., Craiu, D. M., Cepoiu, G. M. (2019). The Relationship between Sustainability and Tourism. *Collaborative Research for Excellence in Economics and Social Sciences*, 230.
- [26] Szucs, L. E., Barrios, L. C., Young, E., Robin, L., Hunt, P., & Jayne, P. E. (2022). The CDC's division of adolescent and school health approach to sexual health education in schools: 3 decades in review. *Journal of School Health*, 92(2), 223-234, <https://doi.org/10.1111/josh.13115>
- [27] P. V., V., Thomas, T., Sait, S. A., & Kasmir, L. (2025). Healthcare Service Quality Over Two Decades: Mapping the Global Research Landscape Through Bibliometrics Analysis. *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, 2(02), 103-123. <https://doi.org/10.65222/VIRAL.2025.9.12>
- [28] Tobler, N. S., & Stratton, H. H. (1997). Effectiveness of school-based drug prevention programs: A meta-analysis of the research. *Journal of primary prevention*, 18(1), 71-128, <https://doi.org/10.1023/A:1024630205999>
- [29] Soare, V. C., Enăchescu, V. A., Latea, C. D., & Bejinariu, C. G. (2025). International collaboration in research and education: mitigating bureaucratic and financial barriers. In EDULEARN25 Proceedings (pp. 8877-8887). IATED., <https://doi.org/10.21125/edulearn.2025.2289>
- [30] Vulpe, M. I., Enăchescu, V. A., & Bărbulescu, R. (2025). Enhancing student engagement and learning outcomes in computer science education through ai-driven personalized learning platforms. In EDULEARN25 Proceedings (pp. 3998-4007). IATED., <https://doi.org/10.21125/edulearn.2025.1040>
- [31] Enăchescu, V. A, Costache B. (2025) Empowering learning through digital leadership in education, INTED2025 Proceedings, pp. 6814-6821. <https://doi.org/10.21125/inted.2025.1753>
- [32] Enăchescu, V. A. (2024) Conducting instructive and educational activities aimed at training professional skills in the economic-financial field, ICERI2024 Proceedings, pp. 5353-5363., <https://doi.org/10.21125/iceri.2024.1313>
- [33] Costache, B., & Enăchescu, V. (2025). Artificial Intelligence in Educational Leadership: Strategic Pathways for Resilient Learning Systems. *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, 1(01), 17-28. <https://doi.org/10.65222/viral.2025.1.1>
- [34] Miller, E., & Thabrew, H. (2024). Universal school-based e-health interventions for wellbeing, anxiety and depression: A systematic review and meta-analysis. *Digital Health*, 10, 20552076241302204, <https://doi.org/10.1177/20552076241302204>
- [35] Costache, B. (2025). Sustainability Pathways in Higher Education Transformation: Digital Innovation and Circular Economy in Singapore and the Global Policy Context. *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, 1(01), 41-58. <https://doi.org/10.65222/viral.2025.1.3>
- [36] Johnson, S., Laham, S., Blanc, S., & Bellanger, M. (2024, November). Cultivating partnerships to incorporate health promotion modules into primary school curricula: a case study in France. In *Frontiers in Education* (Vol. 9, p. 1498753). Frontiers Media SA, <https://doi.org/10.3389/educ.2024.1498753>

