

Life Skills Acquisition among Algerian Secondary Students: Gender and Grade-Level Differences within a Sustainable Education Framework

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Abstract

This study explores life-skills acquisition among secondary school students in Ouargla Province, Algeria, within the framework of Education for Sustainable Development (ESD). Using a descriptive-comparative design, a validated questionnaire assessed four domains: physical, cognitive, psychological/ethical, and teamwork skills. Overall life-skills levels were moderately high, with psychological/ethical competencies strongest and cognitive skills least developed. Gender differences emerged: males scored higher in physical and cognitive domains, whereas females excelled in psychological/ethical and teamwork skills. Students at higher academic levels outperformed peers across all domains, confirming a positive association between school progression and life-skills growth. These findings reveal uneven skill distribution and highlight the need for gender-responsive, developmentally progressive pedagogies. Integrating structured life-skills programs into Algerian secondary education can enhance critical thinking, collaboration, and responsible citizenship, thereby supporting Sustainable Development Goal 4 and advancing national efforts toward a more sustainable society.

Keywords: Life skills, secondary education, gender differences, sustainable education, holistic development.

Introduction

Across the globe, education systems are increasingly expected to prepare students not only for academic success but also for the broader challenges of modern life (Wijaya et al., 2023). Academic knowledge alone is insufficient for meeting the complex demands of contemporary society, making the cultivation of physical, cognitive, psychological, and social competencies essential (Panigrahi et al., 2018). Life skills are defined as psychosocial and interpersonal abilities that enable individuals to manage daily challenges effectively. These include critical thinking, problem-solving,

communication, emotional regulation, and collaboration, all of which are crucial for personal and professional success.

The secondary education stage represents a critical developmental period where identity formation, academic preparation, and social interactions intersect (Ji et al., 2022). At this stage, students face academic pressures, evolving autonomy, and complex relationships, making life-skills acquisition fundamental to both academic and personal development (Chen et al., 2022). Existing research highlights gender-based differences: males often demonstrate advantages in physical and certain cognitive domains (Halpern et al., 2007), whereas females tend to excel in emotional intelligence, communication, and collaborative skills (Hyde, 2014). These patterns are largely attributed to socialization and cultural expectations rather than innate abilities. Similarly, academic progression is generally associated with enhanced life skills through cumulative learning experiences, broader social exposure, and developmental maturation (Erduran Avcı & Korur, 2022).

Despite this evidence, the extent to which formal education systematically fosters life skills remains unclear, particularly in developing contexts where traditional, rote-oriented pedagogies prevail (Feraco et al., 2023). Because life-skills education is also recognized as a key component of UNESCO's Education for Sustainable Development (ESD) agenda and Sustainable Development Goal 4, understanding how these competencies emerge is critical for advancing national and global sustainability efforts (Heasly, et al, 2025 ; Salite et al. 2025).

To address these gaps, the present study investigates life-skills acquisition among Algerian secondary school students, focusing on gender and academic-level differences.

Research Aim and Hypotheses

The primary aim of this study is to examine the extent of life-skills acquisition among Algerian secondary school students and to determine whether statistically significant differences exist according to gender and academic level within the framework of Education for Sustainable Development (ESD).

Based on previous studies and theoretical foundations, the research tests the following hypotheses:

H1: There are significant differences in overall life-skills acquisition between male and female students.

H2: Male students achieve higher levels in physical and cognitive skills than female students.

H3: Female students achieve higher levels in psychological/ethical and teamwork skills than male students.

H4: Life-skills acquisition increases significantly with academic level (first, second, and third year of secondary school).

Theoretical Framework of Life Skills Education

Life skills education emerged from recognition that traditional academic curricula inadequately prepared students for real-world challenges (Nasheeda et al., 2019). The World Health Organization's framework identifies ten core domains, including decision-making, problem-solving, creative and critical thinking, effective communication, interpersonal relationships, self-awareness, empathy, stress management, and emotional regulation (Darlington-Bernard et al., 2023). Recent research emphasizes

integrating these skills into formal curricula due to their role in enhancing academic achievement, psychological well-being, and social adjustment (Jumanto et al., 2024).

Gender Differences in Life Skills Acquisition

Empirical investigations reveal consistent patterns of gender-based differences in life skills development (Else-Quest et al., 2010). Males typically demonstrate advantages in physical competencies and certain cognitive domains, particularly spatial reasoning and mathematical problem-solving (Lindberg et al., 2010). These differences may reflect both biological factors, such as hormonal influences on physical development, and sociocultural expectations that encourage competitive and assertive behaviors in males (Else-Quest & Hyde, 2016).

Conversely, females often excel in psychological and social competencies, including emotional intelligence, empathy, communication skills, and collaborative abilities (Eagly & Carli, 2003). Research suggests these advantages stem from socialization processes that emphasize relational skills and emotional expression in female development (Cross & Madson, 1997). However, contemporary educational approaches increasingly recognize the importance of developing comprehensive skill sets across gender lines rather than reinforcing traditional stereotypes (Joseph & Newman, 2010).

Academic Level and Skill Development

Longitudinal studies consistently demonstrate positive correlations between academic advancement and life skills acquisition (Sukumar et al., 2022). This progression reflects multiple factors, including cognitive maturation, accumulated learning experiences, and increased exposure to diverse social situations (Ritchie & Tucker-Drob, 2018). Upper-level students typically demonstrate enhanced decision-making capabilities, improved emotional regulation, and more sophisticated interpersonal skills compared to their younger counterparts (Moutoussis et al., 2021).

However, the relationship between formal education and life skills development appears complex and context-dependent (Botvin & Griffin, 2004). While some educational systems successfully integrate life skills instruction within academic curricula, others maintain traditional focus on content delivery without explicit attention to skill development (Zamiri & Esmaeili, 2024). This variation underscores the importance of systematic assessment and targeted intervention to optimize student outcomes (Harackiewicz & Priniski, 2018).

Critical Evaluation and Research Gap

Despite the growing body of international research on life-skills acquisition, most existing studies remain descriptive and are concentrated in high-income contexts. Empirical work from North Africa, and Algeria in particular, is scarce, and few investigations combine a comprehensive life-skills framework with the principles of Education for Sustainable Development (ESD).

Moreover, prior studies seldom formulate explicit research questions or hypotheses about gender and grade-level differences, and their findings on gender patterns are inconsistent. Much of the literature also neglects the socioeconomic and cultural conditions that may shape life-skills development in Algerian secondary schools, such as regional disparities and family educational background.

These limitations reveal a clear gap: rigorous, hypothesis-driven research examining gender and academic-level differences in life-skills acquisition within an ESD framework is lacking in the Algerian context. The present study addresses this gap by employing a large regional sample and explicitly testing how gender and grade level relate to multiple dimensions of life skills.

Methodology Research Design

This study adopted a descriptive–comparative design to evaluate the extent of life-skills acquisition among Algerian secondary school students and to identify differences attributable to gender and academic level.(Sánchez-Hernando et al., 2022). This design permits systematic group comparisons while providing a detailed snapshot of current skill levels.

Participants

The sample comprised 414 students (210 males, 204 females) drawn by simple random sampling from six public secondary schools across urban and rural areas of Ouargla Province, Algeria. Students were distributed across three academic levels: first year ($n = 140$), second year ($n = 138$), and third year ($n = 136$).

An a priori power analysis ($\alpha = 0.05$, power = 0.80, medium effect size $f = 0.25$) indicated that a minimum of 342 participants was required for one-way ANOVA; the final sample of 414 therefore exceeded the recommended threshold, ensuring adequate statistical power.

Participation was voluntary. Written parental/guardian consent was obtained for minors, and all students signed informed-assent forms. The study received formal ethical approval from the Institutional Research Ethics Committee of the University of Ouargla.

Instrumentation

Data were collected using a 24-item questionnaire adapted from established life-skills frameworks and previous research(Zadarko-Domaradzka et al., 2024). Items were evenly distributed across four dimensions:

- Physical Skills (6 items): physical fitness, health awareness, bodily coordination.
- Cognitive Skills (6 items): problem-solving, critical thinking, decision-making.
- Psychological/Ethical Skills (6 items): emotional regulation, moral reasoning, self-awareness.
- Teamwork Skills (6 items): collaboration, communication, interpersonal competence.

Responses were rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Three independent experts in educational psychology reviewed the instrument for content validity and cultural appropriateness. A pilot test with 30 students produced Cronbach's $\alpha = 0.89$, confirming high internal consistency.

Data Collection Procedures

Questionnaires were administered in classroom settings—primarily during physical-education periods—to maintain consistent environmental conditions and maximize response rates. Data were gathered over a two-week period (March 2025). Participants were reminded of their right to withdraw at any time without penalty, and confidentiality was guaranteed.

Statistical Analysis

Analyses were performed using SPSS v28.0. Descriptive statistics (means, standard deviations) summarized life-skills scores. Independent-samples t-tests assessed gender differences, and one-way ANOVA with Scheffé post-hoc tests examined differences across academic levels. Statistical significance was set at $p < 0.05$.

To complement p-values, effect sizes were reported: Cohen’s d for t-tests and eta-squared (η^2) for ANOVA, providing estimates of the practical significance of observed differences.

Research Findings

Overall Life Skills Acquisition

Table 1.
Descriptive Statistics for Life Skills Dimensions (N = 414)

Dimension	Mean (M)	SD	Acquisition Level
Physical Skills	2.63	0.38	Moderately High
Cognitive Skills	2.34	0.37	Moderate
Psychological/Ethical Skills	2.71	0.32	High
Teamwork Skills	2.59	0.35	Moderately High
Overall	2.57	0.36	Moderately High

Source: Researcher, IBM SPSS Statistics 28

*Acquisition levels were classified as: Low (1.00–1.80), Moderate (1.81–2.60), Above Moderate (2.61–3.40), High (3.41–5.00).

Overall life-skills scores ranged from moderate to above moderate ($M = 2.57$, $SD = 0.36$). Psychological/ethical skills were highest ($M = 2.71$, $SD = 0.32$), followed by physical skills ($M = 2.63$, $SD = 0.38$) and teamwork skills ($M = 2.59$, $SD = 0.35$), while cognitive skills were comparatively lower ($M = 2.34$, $SD = 0.37$). This pattern suggests relative strength in psychosocial competencies but highlights a need to reinforce cognitive problem-solving abilities.

Gender Differences in Life Skills Acquisition

Table 2.*Life Skills Acquisition by Gender*

Dimension	Male (n = 210)	Female (n = 204)	t-value	p-value	Cohen's d
Physical Skills	2.68±0.39	2.57±0.37	2.89	0.004	0.29
Cognitive Skills	2.41±0.35	2.27±0.34	3.76	<0.001	0.37
Psychological/ Ethical	2.66±0.33	2.77±0.30	-3.42	0.001	0.33
Teamwork Skills	2.54±0.34	2.65±0.36	-2.98	0.003	0.29

Source: Researcher, IBM SPSS Statistics 28

Males outperformed females in physical and cognitive skills, whereas females scored higher in psychological/ethical and teamwork skills. Effect sizes (Cohen's d) were small to moderate, indicating differences of practical but not large magnitude.

Academic Level Differences in Life Skills Acquisition

Table 3*Life Skills Acquisition by Academic Level*

Dimension	First Yr (n=140)	Second Yr (n=138)	Third Yr (n=136)	F-value	p-value	η ²
Physical Skills	2.51±0.40	2.60±0.37	2.72±0.36	15.47	<0.001	0.07
Cognitive Skills	2.22±0.34	2.35±0.36	2.45±0.38	18.92	<0.001	0.08
Psychological/ Ethical	2.64±0.32	2.71±0.31	2.79±0.30	12.33	<0.001	0.06
Teamwork Skills	2.52±0.35	2.58±0.34	2.67±0.33	9.84	<0.001	0.05

Source: Researcher, IBM SPSS Statistics 28

Life-skills scores increased steadily from first- to third-year students across all domains. Eta-squared values indicate small-to-moderate practical effects.

These findings reflect the sociocultural context of Ouargla Province. The modest but significant gender gaps may relate to prevailing cultural expectations—greater encouragement of boys' physical and cognitive activities and girls' emphasis on relational skills. The steady gains across academic levels likely stem from cumulative educational exposure and the region's recent emphasis on project-based learning and civic engagement under Algeria's Education for Sustainable Development initiatives.

Discussion

The present study found that Algerian secondary students exhibit moderate–above moderate levels of life-skills acquisition, with psychological/ethical competencies highest and cognitive skills the weakest. These outcomes support the study’s hypotheses: H1 (overall gender differences) was supported; H2 and H3 (males higher on physical/cognitive; females higher on psychological/teamwork) were supported; and H4 (increases with academic level) was supported by the one-way ANOVA results. Statistically significant differences were accompanied by small-to-moderate effect sizes (Cohen’s $d \approx 0.29\text{--}0.37$; $\eta^2 \approx 0.05\text{--}0.08$), indicating practical but not large magnitudes of group differences (Cohen, 2013).

These findings contribute to the literature in three ways. First, they extend evidence on life-skills acquisition to a North African context that is underrepresented in the literature, thereby informing the ESD (Education for Sustainable Development) agenda in Algeria (UNESCO, 2017). Second, the clear pattern—stronger psychosocial/ethical skills versus weaker cognitive skills—highlights a recurrent tension between character formation and higher-order thinking in curricula that remain influenced by memorization-based pedagogies (Gradini et al., 2025). Third, the observed gender patterns align with global socialization accounts (Chaplin, 2015) but also call for more nuanced, context-sensitive explanations rather than simplistic stereotyping.

These findings also resonate with recent scholarship in Discourse and Communication for Sustainable Education, which highlights the centrality of competence-oriented approaches in Education for Sustainable Development, Van Der Wal-Maris et al., (2025) underscore that sustainable learning environments must intentionally cultivate the very psychosocial and cognitive competences that our Algerian students display in uneven degrees. Likewise, Franzenburg, (2025) emphasizes the role of emotional competence and resilience as key drivers of sustainable education, supporting our interpretation of students’ comparatively strong psychological/ethical skills. At the same time, calls for more future-oriented and inquiry based pedagogies such as those articulated by Ok et al., (2025) in their discussion of artificial-intelligence-driven educational futures—reinforce our argument that stronger, higher-order cognitive skills require pedagogical transformation beyond rote learning. Finally, Cărmădaru (2025) shows how stakeholder-engaged service-learning projects can balance cognitive and socio-emotional growth, suggesting a practical pathway for Algerian secondary schools to achieve more even skill development across domains.

Interpretation in the Algerian (Ouargla) Context

The relative strength in psychological and ethical competencies may reflect local priorities regarding moral education, community responsibility, and familial socialization patterns in Ouargla, as emphasized in national curriculum reports and UNESCO guidelines for Education for Sustainable Development in Algeria (UNESCO, 2017). Conversely, the relative weakness in cognitive and problem-solving skills likely results from limited opportunities for inquiry-based learning and active pedagogy in several schools, a deficit highlighted in critical educational studies and international evaluation reports (Gradini et al., 2025). Gendered differences appear rooted in differential encouragement and access to extracurricular opportunities for boys and

girls—for example, greater access for boys to physical activities—combined with prevailing cultural expectations regarding gender roles. Progressive skill improvement across academic levels suggests that cumulative exposure to schooling fosters positive growth; however, the uneven gains across domains indicate that exposure alone is insufficient for uniform skill development. This highlights the need for targeted curricular and pedagogical interventions to ensure balanced development of both cognitive and socio-emotional skills.

Implications for Policy and Practice

To address the imbalances identified, the study suggests the following targeted actions:

Curriculum integration: Develop and mandate cross-curricular modules that explicitly teach and assess cognitive skills (critical thinking, problem solving) through project-based, inquiry-led tasks rather than solely factual recall.

Teacher professional development: Provide sustained in-service training on active learning, formative assessment of higher-order skills, and classroom strategies that integrate cognitive and socio-emotional objectives.

Gender-responsive programming: Implement mixed-gender cooperative projects and ensure equitable access to physical-activity programs and cognitive-challenge opportunities for girls.

Extracurricular and community linkages: Support after-school clubs, service-learning, and partnerships with local organizations to create authentic contexts for practicing life skills.

Assessment and monitoring: Adopt regular measures that include both self-report and performance-based tasks, and track progress by gender and grade to inform iterative improvements.

This study provides empirical evidence that life-skills education can serve as an effective lever for advancing ESD objectives in middle-income and North African contexts, while also highlighting the limitations of schooling that does not systematically cultivate higher-order cognitive skills. Practically, the findings offer policymakers concrete levers—curriculum design, teacher training, and assessment reform—to align classroom practice with the competencies demanded by SDG-4 (UNESCO, 2017; Gradini et al., 2025).

Conclusions

This study provides a comprehensive overview of life-skills acquisition among Algerian secondary students, revealing moderate to above-moderate overall achievement with notable disparities across skill domains and demographic groups. Psychological and ethical competencies were the strongest, whereas cognitive and problem-solving skills lagged, highlighting the need for pedagogical reforms that maintain strengths in character formation while systematically fostering critical

thinking and analytical abilities. These findings confirm that schools can play a central role in holistic student development beyond traditional academic outcomes, yet the uneven distribution of competencies indicates structural limitations in current instructional practices.

Gender and academic-level differences underscore the importance of curriculum integration, inclusive pedagogical approaches, and ongoing teacher professional development. Targeted interventions—such as cross-curricular modules, inquiry-based learning, and gender-responsive activities—are necessary to ensure equitable development of life skills for all students.

Several limitations should be acknowledged. The cross-sectional design and reliance on self-report measures limit causal inference and may introduce bias due to socially desirable responses. The regional focus (Ouargla Province) restricts national generalizability. Future research should employ longitudinal and mixed-methods designs, include performance-based assessments, and expand sampling across multiple Algerian regions to examine contextual moderators (e.g., socioeconomic status, urban/rural school resources, parental education). Additionally, exploring teacher beliefs and conducting classroom observations would help clarify mechanisms underlying the cognitive–psychosocial gap.

In summary, Algerian secondary schools contribute meaningfully to holistic development, but targeted curricular and pedagogical reforms are required to enhance cognitive and problem-solving skills and to ensure equitable life-skills development across genders and grade levels. Implementing these measures aligns national education practices with the objectives of Education for Sustainable Development (ESD) and Sustainable Development Goal 4, preparing students to navigate complex societal and environmental challenges as responsible, adaptable citizens.

References

- Botvin, G. J., & Griffin, K. W. (2004). Life skills training: Empirical findings and future directions. *The Journal of Primary Prevention*, 25(2), 211–232. <https://doi.org/10.1023/B:JOPP.0000042391.58573.5b>
- Cărmădaru, I. (2025). A stakeholder approach to the assessment of (and for) sustainable service-learning projects. *Discourse and Communication for Sustainable Education*, 16(1), 77–88. <https://doi.org/10.2478/dcse-2025-0007>
- Chaplin, T. M. (2015). Gender and emotion expression: A developmental contextual perspective. *Emotion Review: Journal of the International Society for Research on Emotion*, 7(1), 14–21. <https://doi.org/10.1177/1754073914544408>
- Chen, H. L., Huang, W. H., & Liu, C. H. (2022). Exploring the factors affecting preschool educators' health teaching capacity of life skills using the PRECEDE model: A study of preschool educators in northern Taiwan. *BMC Public Health*, 22(1), 587. <https://doi.org/10.1186/s12889-022-13005-2>
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences* (Ed.). Routledge. <https://doi.org/10.4324/9780203771587>
- Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. *Psychological Bulletin*, 122(1), 5–37. <https://doi.org/10.1037/0033-2909.122.1.5>
- Darlington-Bernard, A., Salque, C., Masson, J., Darlington, E., Carvalho, G. S., & Carrouel, F. (2023). Defining Life Skills in health promotion at school: A scoping review. *Frontiers in Public Health*, 11, 1296609. <https://doi.org/10.3389/fpubh.2023.1296609>

- Eagly, A. H., & Carli, L. L. (2003). The female leadership advantage: An evaluation of the evidence. *The Leadership Quarterly*, 14(6), 807–834. <https://doi.org/10.1016/j.leaqua.2003.09.004>
- Else-Quest, N. M., & Hyde, J. S. (2016). Intersectionality in quantitative psychological Research: II. Methods and techniques. *Psychology of Women Quarterly*, 40(3), 319–336. <https://doi.org/10.1177/0361684316647953>
- Else-Quest, N. M., Hyde, J. S., & Linn, M. C. (2010). Cross-national patterns of gender differences in mathematics: A meta-analysis. *Psychological Bulletin*, 136(1), 103–127. <https://doi.org/10.1037/a0018053>
- Erduran Avci, D., & Korur, F. (2022). Evaluation of the life skills of students in adolescence: Scale development and analysis. *Journal of Science Learning*, 5(2), 226–241. <https://doi.org/10.17509/jsl.v5i2.41071>
- Feraco, T., Resnati, D., Fregonese, D., Spoto, A., & Meneghetti, C. (2023). An integrated model of school students' academic achievement and life satisfaction. Linking soft skills, extracurricular activities, self-regulated learning, motivation, and emotions. *European Journal of Psychology of Education*, 38(1), 109–130. <https://doi.org/10.1007/s10212-022-00601-4>
- Franzenburg, G. (2025). How to facilitate sustainable resilience: Wilhelm Stählin as a model for emotional competence by transformative metaphors. *Discourse and Communication for Sustainable Education*, 16(1), 23–31. <https://doi.org/10.2478/dcse-2025-0003>
- Gradini, E., Firmansyah B, F. B., Noviani, J., & Ulya, K. (2025). Fostering higher-order thinking skills in mathematics education: Strategies, challenges, and classroom practices. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 13(2), 135. <https://doi.org/10.33394/j-ps.v13i2.15099>
- Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbacher, M. A. (2007). The Science of sex differences in science and mathematics. *Psychological Science in the Public Interest*, 8(1), 1–51. <https://doi.org/10.1111/j.1529-1006.2007.00032.x>
- Harackiewicz, J. M., & Priniski, S. J. (2018). Improving student outcomes in higher education: The science of targeted intervention. *Annual Review of Psychology*, 69(1), 409–435. <https://doi.org/10.1146/annurev-psych-122216-011725>
- Heasley, B., Iliško, D. & Lindner, J. (2025). Editorial: Reimagining the future: Unleashing the potential of transformations. *Discourse and Communication for Sustainable Education*, 16(2), 2025. 1-4. <https://doi.org/10.2478/dcse-2025-0012>
- Hyde, J. S. (2014). Gender similarities and differences. *Annual Review of Psychology*, 65(1), 373–398. <https://doi.org/10.1146/annurev-psych-010213-115057>
- Jamil, M., Zahra, H., & Fida, F. (2024). Integrating life skills in secondary education: Teachers' perspectives and challenges. *Journal of Social & Organizational Matters*, 3(4), 01–10. <https://doi.org/10.56976/jsom.v3i4.112>
- Ji, X., Zheng, S., Cheng, C., Cheng, L., & Cronin, L. (2022). Development and psychometric evaluation of the Chinese version of the life skills scale for physical education. *International Journal of Environmental Research and Public Health*, 19(9), 5324. <https://doi.org/10.3390/ijerph19095324>
- Joseph, D. L., & Newman, D. A. (2010). Emotional intelligence: An integrative meta-analysis and cascading model. *Journal of Applied Psychology*, 95(1), 54–78. <https://doi.org/10.1037/a0017286>
- Jumanto, J., Waluyo, D. E., Purwatiningsih, A. P., Andono, P. N., Nugroho, R. A., Ramayanti, I., & Minghat, A. D. B. (2024). IMRAD, synthesis, and hedging within expert

- academic writing to encourage a world discussion platform. *Studies in English Language and Education*, 11(3), 1450–1472. <https://doi.org/10.24815/siele.v11i3.34776>
- Lindberg, S. M., Hyde, J. S., Petersen, J. L., & Linn, M. C. (2010). New trends in gender and mathematics performance: A meta-analysis. *Psychological Bulletin*, 136(6), 1123–1135. <https://doi.org/10.1037/a0021276>
- Moutoussis, M., Garzón, B., Neufeld, S., Bach, D. R., Rigoli, F., Goodyer, I., Bullmore, E., Guitart-Masip, M., Dolan, R. J., Fonagy, P., Jones, P., Hauser, T., Romero-Garcia, R., St Clair, M., Vértes, P., Whitaker, K., Inkster, B., Prabhu, G., Ooi, C., ... Kievit, R. (2021). Decision-making ability, psychopathology, and brain connectivity. *Neuron*, 109(12), 2025–2040.e7. <https://doi.org/10.1016/j.neuron.2021.04.019>
- Nasheeda, A., Abdullah, H. B., Krauss, S. E., & Ahmed, N. B. (2019). A narrative systematic review of life skills education: Effectiveness, research gaps and priorities. *International Journal of Adolescence and Youth*, 24(3), 362–379. <https://doi.org/10.1080/02673843.2018.1479278>
- Ok, G., Kaya, D., & Kutluca, T. (2025). Artificial intelligence for a sustainable future in the 21st century: Impacts and reflections on education. *Discourse and Communication for Sustainable Education*, 16(1), 109–136. <https://doi.org/10.2478/dcse-2025-0009>
- Panigrahi, R., Srivastava, P. R., & Sharma, D. (2018). Online learning: Adoption, continuance, and learning outcome—A review of literature. *International Journal of Information Management*, 43, 1–14. <https://doi.org/10.1016/j.ijinfomgt.2018.05.005>
- Ritchie, S. J., & Tucker-Drob, E. M. (2018). How much does education improve intelligence? A Meta-Analysis. *Psychological Science*, 29(8), 1358–1369. <https://doi.org/10.1177/0956797618774253>
- Salite, I., Fjodorova, I. & Ivanova, O. (2025). Editorial: What values will foster a more sustainable human and educational future? *Journal of Teacher Education for Sustainability*, 27(1), 2025. 1-5. <https://doi.org/10.2478/jtes-2025-0001>
- Sánchez-Hernando, B., Gasch-Gallén, Á., Antón-Solanas, I., Gea-Caballero, V., Juárez-Vela, R., Gállego-Diéguez, J., Carboneres-Tafaner, M. I., Echániz-Serrano, E., Lasso-Olayo, L., & Santolalla-Arnedo, I. (2022). A comparative study of life skills, lifestyle habits and academic performance in health promoting and non-health promoting schools in the Autonomous Community of Aragon, Spain. *Peer Journal*, 10, e13041. <https://doi.org/10.7717/peerj.13041>
- Sukumar, G. M., Shahane, S. S., Shenoy, A. B., Nagaraja, S. R., Vasuki, P. P., Lingaiah, P., Rajneesh, S., & Banandur, P. S. (2022). Effectiveness and factors associated with improved life skill levels of participants of a large-scale youth-focused life skills training and counselling services program (LSTCP): Evidence from India. *Behavioral Sciences*, 12(6), 191. <https://doi.org/10.3390/bs12060191>
- UNESCO. (2017). *Education for Sustainable Development Goals: Learning objectives*. UNESCO. <https://doi.org/10.54675/CGBA9153>
- Van Der Wal-Maris, S. J., Koene, J., & Mout, F. (2025). Education for sustainable development shaped as social entrepreneurship education (SEE) – Students' perceptions of required competences and learning environment in teacher education. *Discourse and Communication for Sustainable Education*, 16(1), 5–22. <https://doi.org/10.2478/dcse-2025-0002>

- Verhaest, D., & Omeij, E. (2013). The relationship between formal education and skill acquisition in young workers' first jobs. *The Manchester School*, 81(4), 638–659. <https://doi.org/10.1111/j.1467-9957.2012.02305.x>
- Wijaya, O. S., Amaliah, A., Chamami, M. R., Syahrani, F., & Rosadi, A. (2023). The role of teachers as facilitator of holistic education: Current approaches to teaching. *Global International Journal of Innovative Research*, 1(2), 132–138. <https://doi.org/10.59613/global.v1i2.15>
- Zadarko-Domaradzka, M., Sobolewski, M., Ozimek, M., & Zadarko, E. (2024). Life skills of physical education university students: Identification of needs – Implications for educational practice. *Journal of Kinesiology and Exercise Sciences*, 34(107), 40–53. <https://doi.org/10.5604/01.3001.0054.8602>
- Zamiri, M., & Esmaeili, A. (2024). Strategies, methods, and supports for developing skills within learning communities: A systematic review of the literature. *Administrative Sciences*, 14(9), 231. <https://doi.org/10.3390/admsci14090231>

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