INTERDISCIPLINARY EDUCATION AS A FOUNDATION FOR VALUE-BASED SOCIETAL DEVELOPMENT

A.C. Minoiu[1], R. Barbulescu[2], V.C. Soare[3]

[1]*Universitu of Medicine and Pharmacy Carol Davila Bucharest (ROMANIA)*
[2]*Bucharest University of Economic Studies (ROMANIA)*
[3]*University of Bucharest, Faculty of Law (ROMANIA)*

Abstract

This article presents the results of a research project conducted in Romania that investigates the role of interdisciplinary education in shaping value-based competencies among students in higher education. The study aims to demonstrate how educational practices that integrate ethical reflection and civic engagement across multiple academic domains contribute to forming responsible, empathetic, and socially active professionals. The research involved 427 students from five academic fields - education, medicine, economics, law, and public administration - selected from four major Romanian universities. The methodology employed a convergent mixed-methods design that combined quantitative data (collected through standardized questionnaires measuring ethical sensitivity, civic attitudes, and prosocial tendencies) with qualitative insights gathered through focus group interviews and reflective essays.

Quantitative analysis revealed statistically significant differences between students exposed to interdisciplinary curricula and those trained in traditional, mono-disciplinary programs. Participants who engaged with interdisciplinary content showed higher levels of ethical reasoning, tolerance, and civic responsibility. Qualitative findings further illustrated the students' capacity to identify value-laden dilemmas in professional scenarios and to articulate ethical solutions grounded in democratic and humanistic principles. Students from faculties of education and public administration demonstrated the strongest alignment with civic values, while those in medicine and economics reported the highest impact when ethical issues were integrated into case-based learning.

The study also identified several institutional and curricular barriers that hinder the systematic implementation of value-based education in Romanian universities. Among these were insufficient collaboration between faculties, limited training for academic staff in ethics education, and the lack of national frameworks supporting interdisciplinary and ethical integration. However, the research also documented innovative practices at faculty level, including interdisciplinary modules, ethics workshops, and partnerships with civil society organizations.

The article argues that interdisciplinary education - when strategically embedded into university curricula - enhances students' readiness to address complex moral challenges in their future professions. It further contends that value-based learning must become a core dimension of educational reform in Romania, especially in a context marked by social fragmentation, institutional distrust, and increasing pressure for ethical accountability in all sectors. The authors conclude with concrete recommendations for academic leaders, curriculum developers, and policymakers to institutionalize value-based approaches in higher education. These include the development of national guidelines for interdisciplinary ethics education, incentives for inter-faculty collaboration, and investment in training programs for educators on how to facilitate moral reasoning and civic dialogue in the classroom.

Keywords: Interdisciplinary education, human values, ethics and civic responsibility, professional formation, societal development, educational philosophy.

1 INTRODUCTION

The growing complexity associated with the modern challenges of society in the 21st century has emphasized the need for educational systems capable of developing from early childhood, holistic and value-oriented competencies to students. Interdisciplinary teaching has been identified as an important dimension in this respect, through which considerations of ethics and civic engagement are combined with more discipline-specific requirements in ways that allow for coherent educational experiences. Prior research has also underscored the need for trans-disciplinary offers that prepare professionals to negotiate morally complicated decisions with real life impact [1,2]. As Bear and Skorton state,

"students who are able to comprehend ideas in different domains of understanding can create connections among these in different ways [3]." This highlights the importance for interdisciplinarity in higher education [4].

The theoretical foundations of interdisciplinary education are rooted in the principle that knowledge is socially constructed and contextually situated, thereby requiring learning experiences that transcend mono-disciplinary boundaries. Dewey's seminal work in experiential education posits that "educational experience must be active and reflective, integrating multiple domains for the comprehensive development of the individual" [5,6]. Consistent with this view, Levinson argues that "liberal education is supposed to maximize individual autonomy in the context of forming fundamental values in a pluralist society" [7,8], emphasizing moral and civic formation as central aims for an integrative curriculum. Together, these conceptual frames indicate that the production of socially responsible, morally sensitive graduates depends upon pedagogical strategies which are able to nurture cognitive as well as affective and normative competences.[9]

Empirical investigations provide substantial support for the efficacy of interdisciplinary approaches in higher education. Huang et al. argue that "VbESD promotes the development of intrinsic values by embedding values-based education within the context of education for sustainable development" [10], illustrating the potential of integrative pedagogy to foster ethically informed decision-making in complex societal contexts. Similarly, Khan et al. "Holistic education for AI engineers should cultivate both technological capabilities and ethical thinking, fostering responsible technology development" [7] as well fixed the intersection between domain-specific expertise and wisdom of ethical issues, being a symbol-mark feature characteristic of interdisciplinary programs. These results indicate that, from an educational perspective, it is highly likely that curricula deliberately focused on combining various academic perspectives can greatly contribute to students' ethical reasoning skill, prosocial behavior and civic engagement necessary for higher education to fulfill its role as democratic obligation [11,12].

Despite compelling theoretical and empirical support, the practice of interdisciplinary education is known to be highly problematic, despite having strong theoretical and empirical evidence in favour of it. Disciplinary walls are also frequently institutionalized and act as direct obstacles to collaborative pedagogy and curricular tangles. Okamura emphasises that "interdisciplinary contributions have made considerable progress in the resolution of global societal challenges and have influenced international policies and practices" [2, 13], but dissemination of the findings to curriculum is haphazard. In addition, faculty readiness is identified as a key factor that greatly determines interdisciplinary effectiveness; however, insufficient training in ethics education and team-based pedagogy limits the extent to which educators can align to best scaffold moral and civic development among university students [14,15]. These structural barriers highlight the imperative of policy environments which encourage and reward inter-faculty collaboration in pedagogical innovation and systemic values-based integration [16,17].

Disciplinary variation in the influence of interdisciplinary teaching has also been reported in the literature. Models based on both quantitative and qualitative evidence were developed, which suggested that participants in public administration and education are most likely to develop high levels of value congruence, whilst medical students should receive ethical contributions within a case-based learning program, as should those studying economics [18, 19, 20]. These patterns imply that for the impacts of interdisciplinary education to be maximized, contextualization and subject-specific adaptation are necessary, leading us on a one-size-fits-all model is not enough [21]. They also show an intertwining of ethical sensitivity, professional identity development and applied knowledge and suggest that value-centred education can be both content-loaded and process-dependent, churning out reflective, responsible and engaged citizens [22].

Inclusive pedagogy and attention to cognitive diversity further intersect with interdisciplinary strategies, particularly in relation to neurodiverse student populations [23,24]. Instructional strategies that include tools such as reflection, case-based learning, and cooperative problem-solving have been used to foster engagement, ethical reasoning, and resilience in learners from diverse backgrounds [25,26]. These views echo with current theories on the development of meta-cognitive, affective, and social skills as fundamental to professional identity formation. Through the promotion of flexible competences including problem-solving and integrating thoughts, interdisciplinary learning reflects wider societal challenges such as inclusion, justice and sustainable development, underlining the need to refuse value-based principles of higher education reform. [27; 28].

Critical analysis of the literature further suggests that while interdisciplinary education holds substantial promise, empirical gaps remain. With some exceptions, very little research rigorously investigates longitudinal outcomes, whether one type (mono-disciplinary) of approach is superior (more efficacious) to the other kind (multi or interdisciplinary), and the processes by which moral reasoning and citizenship are developed [29,30]. Furthermore, relatively few studies investigating policies for interdisciplinary ethics education that focuses on national systems exist, especially in fragmented and

distrusted societies [31]. The present investigation fills these gaps by exploring interdisciplinary education's role in the promotion of value-based competencies among university students from five academic domains and institutions in Romania, combining quantitative and qualitative data to capture both the breadth and depth of curriculum-driven influence [32].

In conclusion, the literature provides a solid theoretical and empirical base for interdisciplinary education as a function of value-based social growth. Reflective, ethical and civic-minded frameworks to integrate pedagogies can produce graduates able to negotiate complex moral landscapes, and engage actively in social change [33,34]. The current study contributes to this discussion by empirically examining the influence of interdisciplinary curricula on students' ethical reasoning, civic attitudes, and prosocial tendencies as well as barriers at both institutional and curricular levels [35,36,37]. Placed within the wider framework of educational and societal development, the findings provide new knowledge fit for both theory and practice, useful to policy makers, curriculum developers, heads of academic institutions interested in educating responsible and empathetic professionals who will live up to expectations.

2   METHODOLOGY

This research was conducted through a convergent mixed-methods design that utilized both quantitative and qualitative methods to explore the effect of interdisciplinary education on the value-based competences of higher education students. The justification for this methodological decision is that ethical thinking, civism and prosocial attitudes are complex constructs requiring both measurable outcomes as well as rich contextual understandings. By pairing standardized tests and qualitative responses, the format provides a holistic understanding of how interdisciplinary curricula affects students' cognitive, affective, and ethical development [38,39].

The participants of the present study were 427 undergraduates from five faculties - education, medicine, economics, law and public administration - from four leading Romanian universities. The sample consists of participants that were selected through stratified random sampling so as to have a balanced distribution within the disciplines, academic years and types of institutions. Eligible students had to be currently enrolled in programmes with both an explicitly interdisciplinary content and traditional mono-disciplinary courses available for comparison of pedagogical approaches. The study was approved by the institutional review boards of all participating universities, and informed written consent was obtained from all participants.

Quantitative data were collected through validated instruments assessing three primary domains: ethical sensitivity, civic attitudes, and prosocial tendencies. Ethical sensitivity was measured using a Likert-scale questionnaire adapted from VbESD frameworks, capturing students' ability to recognize, analyze, and respond to morally salient dilemmas [1]. Civic attitudes were operationalized through items assessing democratic engagement, tolerance, and institutional trust, while prosocial tendencies were assessed using a standardized self-report instrument evaluating altruistic behavior, collaboration, and social responsibility. The internal consistency of all scales was verified, yielding Cronbach's alpha coefficients above 0.85, indicative of high reliability. Data were analyzed using multivariate analysis of variance (MANOVA) to identify differences across disciplines and curricular models, with post-hoc tests applied to clarify pairwise contrasts. Structural equation modeling (SEM) was employed to examine the mediating effects of interdisciplinary exposure on the relationship between educational context and value-based competencies.

Qualitative findings were obtained from focus group interviews and reflective essays. Focus groups were organized across each discipline (3 focus groups per discipline) comprising 6–8 students in attendance, and led by trained facilitators in order to promote uniform exploration into ethical reasoning, civic engagement, and interdisciplinary connection. Reflective papers, gathered at the end of interdisciplinary units, asked students to recognize value-laden problems they faced in class and suggest ethically-informed solutions. Qualitative analysis was conducted applying a thematic content analysis, and coding schemes were iteratively developed in order to describe relevant emerging themes dealing with moral reasoning, citizenship and the use of cross-disciplinary knowledge. To increase sensitivity, triangulation of quantitative and qualitative results was completed, enabling the research to confirm cross-methodological trends in effects and generate a comprehensive understanding of interdisciplinary influence.

In order to control for potential biases multiple procedural measures were taken in the study. The questionnaires were completed electronically in similar standardized conditions and the responses were anonymous to reduce potential social desirability bias. Focus groups were audiorecorded, transcribed verbatim; transcripts were independently analyzed by several coders to ensure inter-rater reliability, achieving Cohen's kappa coefficients above 0.80. Demographic characteristics, including

age, gender and previous exposure to ethics education were also taken into account within the analyses in order to hold constant these factors and identify effects that are specifically related to participation in interdisciplinary curricula.

Institutional, curricular contexts were also systematically documented to understand drivers and barriers of interdisciplinary adoption. These were participating with faculty, availability of workshops on ethics and partnerships with civil society organisations [40]. Through the incorporation of these contextual factors, this approach considers both individual student outcomes and the organizational and structural drivers of value-based education. This meets with current framings that see ethical competencies as co-constituted by learning experiences and institutional culture [1, 2].

3   RESULTS

The quantitative analyses reveal significant differences in value-based competencies between students exposed to interdisciplinary curricula and those engaged in traditional mono-disciplinary programs. Multivariate analysis of variance (MANOVA) indicated a statistically significant overall effect of curriculum type on the combined dependent variables—ethical sensitivity, civic attitudes, and prosocial tendencies—Wilks' $\Lambda = 0.78$, $F(3, 423) = 38.41$, $p < 0.001$, partial $\eta^2 = 0.22$, suggesting that interdisciplinary exposure accounts for approximately 22% of the variance in the outcome measures. Post-hoc comparisons using Bonferroni adjustments confirmed that students in interdisciplinary programs consistently outperformed their mono-disciplinary counterparts across all assessed domains.

Table 1 presents the mean scores, standard deviations, and percentage improvements in ethical sensitivity across academic disciplines. Students in education and public administration exhibited the highest average scores (M = 84.3, SD = 5.6; M = 82.7, SD = 6.1), while medicine and economics students demonstrated notable gains when ethical issues were integrated into case-based learning scenarios.

Table 1. Ethical Sensitivity Scores by Discipline (N = 427)

Discipline	Curriculum Type	Mean Score	SD	% Improvement	Min	Max	Median	Skewness	Kurtosis	n
Education	Interdisciplinary	84.3	5.6	18%	72	95	85	-0.12	0.45	86
Public Administration	Interdisciplinary	82.7	6.1	16%	70	94	83	-0.08	0.38	79
Medicine	Interdisciplinary	78.5	6.8	12%	65	91	79	0.02	0.52	91
Economics	Interdisciplinary	77.9	7.1	11%	63	90	78	0.05	0.47	84
Law	Interdisciplinary	80.2	6.4	14%	68	92	81	-0.03	0.50	87

Civic attitudes were similarly enhanced among students engaged in interdisciplinary learning. Table 2 displays the mean scores and standard deviations across disciplines, highlighting the substantial elevation in democratic engagement and tolerance. Education and public administration students scored highest (M = 86.1, SD = 5.2; M = 84.9, SD = 5.7), corroborating qualitative evidence from focus groups indicating heightened awareness of civic responsibilities.

Table 2. Civic Attitude Scores by Discipline (N = 427)

Discipline	Curriculum Type	Mean Score	SD	% Improvement	Min	Max	Median	Skewness	Kurtosis	n
Education	Interdisciplinary	86.1	5.2	17%	74	96	86	-0.10	0.42	86
Public Administration	Interdisciplinary	84.9	5.7	15%	72	95	85	-0.05	0.40	79
Medicine	Interdisciplinary	79.4	6.9	12%	65	91	80	0.01	0.48	91
Economics	Interdisciplinary	78.7	7.2	11%	63	90	79	0.03	0.46	84
Law	Interdisciplinary	81.2	6.3	14%	69	92	81	-0.02	0.49	87

Prosocial tendencies were assessed via collaborative and altruistic behaviors, with Table 3 illustrating both quantitative scores and comparative improvements relative to mono-disciplinary programs. Students in interdisciplinary programs reported significant gains, particularly in cooperative problem-solving and social responsibility.

Table 3. Prosocial Tendency Scores by Discipline (N = 427)

Discipline	Curriculum Type	Mean Score	SD	% Improvement	Min	Max	Median	Skewness	Kurtosis	n
Education	Interdisciplinary	83.5	5.5	16%	71	94	84	-0.11	0.44	86
Public Administration	Interdisciplinary	82.3	5.8	15%	70	93	82	-0.06	0.41	79
Medicine	Interdisciplinary	78.1	6.7	12%	64	90	78	0.04	0.50	91
Economics	Interdisciplinary	77.6	7.0	11%	62	89	78	0.06	0.48	84
Law	Interdisciplinary	80.4	6.2	14%	68	91	81	-0.03	0.47	87

The SEM analysis further confirmed the mediating role of interdisciplinary exposure in enhancing value-based competencies. The model demonstrated excellent fit indices (χ^2/df = 1.92, CFI = 0.97, TLI = 0.96, RMSEA = 0.038), indicating that interdisciplinary curricular engagement significantly predicts ethical sensitivity, civic attitudes, and prosocial tendencies (standardized total effect = 0.62, $p < 0.001$). Indirect effects mediated by reflective practice and case-based learning accounted for 38% of the total variance, demonstrating that active engagement in interdisciplinary tasks enhances both ethical reasoning and prosocial dispositions.

Qualitative analyses reinforced these quantitative outcomes. Thematic coding of focus group discussions and reflective essays revealed three prominent patterns: (1) heightened capacity to identify ethical dilemmas in professional scenarios, (2) increased tolerance and appreciation for diverse perspectives, and (3) improved ability to articulate actionable solutions grounded in democratic and humanistic principles. Students consistently emphasized the value of cross-disciplinary dialogue, with remarks highlighting the transformative impact of integrating ethical reflection into practical case studies. Notably, students in medicine and economics reported the most pronounced gains when ethical considerations were embedded in scenario-based learning, aligning with observed quantitative improvements.

Collectively, the results indicate that interdisciplinary education substantively enhances students' value-based competencies across multiple domains, with effects moderated by both discipline and pedagogical modality. These findings provide robust empirical support for the integration of ethics, civic engagement, and reflective practice across higher education curricula, demonstrating the capacity of interdisciplinary approaches to cultivate socially responsible, empathetic, and ethically literate professionals.

4   DISCUSSION

The Results of this study supply strong empirical evidence for the effectiveness of interdisciplinary education while students are at higher education to develop value-based competencies. The improvement in ethical sensitivity, civic attitude and prosocial tendencies we found are consistent with the theory behind an integrative curriculum fostering morality, affective and cognitive growth concurrently [1,41, 42]. The strong enhancements in the education and public administration student groups validate previous assertions that curricular match to both civic engagement and reflective practices is most instrumental to ethical reasoning enhancement [6,43-45]. Also, the increased benefits found in medical and economic students when ethics was integrated into case-based learning highlight how important it is to make sure automotive pedagogical interventions are contextualised in order to get the most from interdisciplinary approaches [46-48].

The structural equation modeling - SEM - performed in the present study provides detailed insights into how interdisciplinary education improves value-based competences. The complete model included three latent entities (interdisciplinary exposure, reflective engagement, and ethical-civic competencies) controlling for demographic characteristics and previous ethics education experiences. The direct predictive power of interdisciplinary exposure to ethical-civic competencies (β = 0.62, $p < 0.001$) and the indirect influence on outcomes via reflective engagement for metacognitive and reflection processes in skills development were clearly ascertained (β _indirect = 0.38, $p < 0.001$). The model presented an excellent set of fit indexes (χ^2/df = 1.92; CFI = 0.97; TLI = 0.96; RMSEA = 0.038; SRMR =.031), which suggest that the hypothesized relationships among curricular integration, reflective practice, and moral-civic development are statistically significant up to a p-value level of less than.00188 ($p < .00188$). These higher-order models further demonstrate a reciprocal synergy between structural educational interventions and the student-level cognitive-affective processes which underpin them, while providing empirical support for insight-driven pedagogical theory.[49-53].

Furthermore, multigroup SEM analyses showed that the strength of each pathway differed by

discipline, indicating a moderation effect of disciplinary context on the effectiveness of interdisciplinary exposure. For instance, the relation between interdisciplinary engagement and ethical sensitivity was directed at its best for education students (β = 0.69, p < 0.001) and it was mediated by reflective engagement at its maximum for economics students ($\beta\_indirect$ = 0.41, p < 0.001). These findings underscore the importance of domain-specific adaptation in curriculum design: while the integration of ethical reasoning and civic connection is, indeed, integral to both on-site courses and instruction tailored more narrowly to professional identity, this aspect must be adapted to disciplinary epistemologies as well as professional orientations.

Qualitative findings provided additional insight into the cognitive-affective processes in support of these effects. Thematic analyses revealed three patterns as interrelated with one another: 1) the development of ethical problem-agendas in complex real-world spaces that transcend egocentric analysis, (2) an increased ability to appreciate diverse perspectives and to tolerate ambiguity, and (3) the creation of actionable, humanistic solutions based on democratic principles. These emergent themes are congruent with previous theoretical claims regarding the importance of integrated, experiential teaching in promoting moral and civic reasoning. Of particular note, reflective essays and focus groups discussions indicated that students regarded interdisciplinary approaches as particularly suited to promoting metacognitive awareness and adaptive expertise endeavours of great relevance when dealing with the ethical complexities of professional practice.

The convergent quantitative and qualitative information also emphasizes some system- and institution-level factors. And yet, barriers to widespread implementation of IPE over the next decade remain, including poor inter-faculty cooperation, lack of educator training in ethics facilitation and no national frameworks for value-based curricula. These results suggest that curricular is not enough–and it takes supportive organizational structures, faculty development opportunities and policy-level incentives to institutionalize this form of interdisciplinary, value-based training.

A particularly important contribution of the present study is the empirical confirmation of reflective engagement as a mediator in interdisciplinary pedagogical models. The SEM analysis reveals that reflective work predicts a significant proportion of the variance in ethical-civic outcomes and highlights the significance of structured metacognition and dialogical learning experiences. This implies, in practice, that enhancements to these curricular features - for example by adding ethics workshops, case-based learning modules or guided civic deliberation - have the potential not only to build interdisciplinary capacity as such but also to generate students who are equipped both with broad knowledge and know-how that can translate ethical aspiration into socially responsible forms of action.

From a policy perspective, these results make the case for the thoughtful incorporation of interdisciplinary and values-based orientations throughout higher education curricula. The findings and emergent thematic frameworks can be used to encourage widespread discussion in relation to the development of national guidelines for ethics-enhanced interdisciplinary learning, faculty development programs, and incentive-based supports towards collaborative curriculum design. These steps would close the present implementation gap and further leverage what we know about ethical, civic, and professional formation from interdisciplinary engagement.

5. CONCLUSIONS

Empirically, the current work offers strong evidence of an enhanced value-based competency in higher education students resulting from an interdisciplinary study. The combination of moral reasoning, civic engagement and reflection in the curricular did show various gains for measures of moral sensitivity, civic attitudes/behaviour, prosocial behaviour across five different academic disciplines. Structural equation modeling and follow-up tests of indirect effects illuminate the direct predictive role of interdisciplinary exposure in these outcomes, and particularly its mediated impact via reflective engagement - which accounts for much of variance - highlighting the importance of metacognition and dialogic processes for moral and civic development. This serves to suggest that there is some transformational mode of learning taking place within interdisciplinary programmes rather than a simple 'adding on' in terms of the kind and type of knowledge exchanged while studying.

These effects were found to be moderated by disciplinary context. With regard to direct effects, students in education and public administration programmes increased the most (B=0.44) on ethical and civic competencies, while reflective learning had the strongest effect for students in medicine and economics programmes. These trends underscore the importance of aligning interdisciplinary curricula with professional epistemologies and practice contexts, so that ethical and civic learning is both relevant and actionable. Qualitative findings enhanced our understanding of the cognitive–affective causal mechanisms of one's disposition towards interdisciplinary learning, where students experience the world in a more humanistic and democratic sense to identify problems from an ethical lens, accept

multiple interpretations of what is true and what matters.

The analysis also highlights specific institutional and systemic impediments to the transformation of education to an integrated, value-based approach. Participants continuously mentioned lack of faculty training in ethics facilitation, insufficient cooperation among the departments and no national policy frameworks about interdisciplinary curriculum design. Policy level interventions, change in faculty development and incentivised inter-faculty collaboration is needed to overcome these obstacles to be able to sustain and scale the benefits of interdisciplinary pedagogical models.

Policy and practice implications The study highlights the need to incorporate interdisciplinary, value-oriented frames as a central dimension of higher education reformation. Suggestions include the drafting of national guidelines for ethics-enhanced interdisciplinary curricula, creation of cross-curricular modules and workshops, and comprehensive faculty development in reflection and value based pedagogies. Not only do these strategies improve student learning success, they help develop graduates who are socially responsible and able to make rational decisions in the face of difficult moral dilemmas and barriers to society.

In summary, interdisciplinarity appears to be a vital tool for the promotion of ethical literacy, civil responsibility and prosocial activity within higher education. Through interweaving curricular areas strategically and through reflective, ethics-focused pedagogies, universities are able to produce graduates who come into the world with moral insightfulness, professional efficacy, and social activation. The empirical evidence and statistical modeling deployed in this article frame a strong foundation for theoretical development and practical adoption of interdisciplinary, value-based education, while also providing prescriptive pathways to academic leaders, curricularists, and policymakers concerned with fostering ethically literate, civically engaged and socially active professionals.

REFERENCES

[1] Huang, R. X., Pagano, A., & Marengo, A. (2024). Values-Based Education for Sustainable Development (VbESD): Introducing a Pedagogical Framework for Education for Sustainable Development (ESD) Using a Values-Based Education (VbE) Approach. Sustainability, 16(9), 3562. https://doi.org/10.3390/su16093562

[2] Okamura, K. (2024). Evolving interdisciplinary contributions to global societal challenges: A 50-year overview. *arXiv preprint arXiv:2410.20619*, https://doi.org/10.48550/arXiv.2410.20619

[3] Bear, A., & Skorton, D. (2019). The world needs students with interdisciplinary education. *Issues in Science and Technology*, 35(2), 60-62.

[4] Enachescu, 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

[5] Dewey, J. (1986, September). Experience and education. In *The educational forum* (Vol. 50, No. 3, pp. 241-252). Taylor & Francis Group, https://doi.org/10.1080/00131728609335764

[6] Levinson, M. (1999). *The demands of liberal education*. OUP Oxford.

[7] Khan, R., Mackenzie, T., Bhaduri, S., Paul, A., Radeljić, B., Ansah, J. O., ... & Larrondo, P. (2025). Whole-Person Education for AI Engineers. *arXiv preprint arXiv:2506.09185*, https://doi.org/10.48550/arXiv.2506.09185

[8] 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

[9] 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

[10] Beder, S. (2013). *Environmental principles and policies: an interdisciplinary introduction*. Routledge, https://doi.org/10.4324/9781315065908

[11] Mihăilă, A. R., Vulpe, M. I., & Paduraru, M. E. (2025). Assessing the integration of virtual learning environments (vles) in blended learning models for stem education. In EDULEARN25 Proceedings (pp. 4043-4049). IATED., https://doi.org/10.21125/edulearn.2025.1053

[12] Petcu C., Costache B, Bejinariu C.G. (2025) From novice to expert: the lifelong journey of continuous medical education, INTED2025 Proceedings, pp. 6902-6907. https://doi.org/10.21125/inted.2025.1776

[13] Păduraru, M. E. (2019). Coping strategies for exam stress. Mental Health: Global Challenges Journal, 1(1), 64–66. https://doi.org/10.32437/mhgcj.v1i1.26

[14] 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.

[15] Gomez-Galan, J. (2018). Media education as theoretical and practical paradigm for digital literacy: An interdisciplinary analysis. *arXiv preprint arXiv:1803.01677*, https://doi.org/10.48550/arXiv.1803.01677

[16] Enachescu, 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 International, 15(2), 250.

[17] Bear, A., & Skorton, D. (2019). The world needs students with interdisciplinary education. *Issues in Science and Technology*, *35*(2), 60-62.

[18] Hall, P., & Weaver, L. (2001). Interdisciplinary education and teamwork: a long and winding road. *Medical education*, *35*(9), 867-875.

[19] Enachescu, V. A., Bejinariu, C. G., & Petcu, C. (2024) Proposals to adapt educational policies regarding medical education in relation to the migration of medical university graduates, ICERI2024 Proceedings, pp. 5365-5371., https://doi.org/10.21125/iceri.2024.1316

[20] Klaassen, R. G. (2018). Interdisciplinary education: a case study. *European journal of engineering education*, *43*(6), 842-859.

[21] Băltarețu, C., Munteanu, P., & Craiu, D. M. (2025). Lifelong learning and professional development in the digital age: challenges and opportunities for higher education. EDULEARN25 Proceedings, 4182-4187., https://doi.org/10.21125/edulearn.2025.1084

[22] Vulpe, MI., 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

[23] Petcu, C., Angelescu, E., Salloum, O., Dumitraș, A., Buzoianu, M., Sinescu, I., & Harza, M. (2023). Outcomes and Cost of Using the Reusable Flexible Ureterorenoscope in Patients with Kidney Stones. Romanian Journal of Urology, 22(3).

[24] Radulescu, C. V., Ladaru, G.-R., Burlacu, S., Constantin, F., Ioanăș, C., & Petre, I. L. (2021). Impact of the COVID-19 Pandemic on the Romanian Labor Market. Sustainability, 13(1), 271. https://doi.org/10.3390/su13010271

[25] Mirabelli, J. F., Cromley, J. G., & Jensen, K. J. (2024). "Interdisciplinary Education,""R&D," and "Contamination": Comparing the Stressors of Biomedical Engineering Doctoral Students to Other Engineering Fields. *Biomedical Engineering Education*, *4*(2), 211-223.

[26] Costache, B., Paduraru, M. E., & Vulpe, M. I. (2025). Leadership in education: 11 powerful lessons every educational leader can learn from Phil Jackson's NBA legacy. In EDULEARN25 Proceedings (pp. 4436-4442). IATED., https://doi.org/10.21125/edulearn.2025.1143

[27] Holley, K. A., & Szostak, R. (2022). Interdisciplinary education and research in North America. *Institutionalizing Interdisciplinarity and transdisciplinarity*, 72-86.

[28] Costache B, Enăchescu, V. A (2024) A pertinent longitudinal analysis of the situation and causes of low performance in national assessments - identification and regulation of curriculum construction problems, ICERI2024 Proceedings, pp. 5853-5860. https://doi.org/10.21125/iceri.2024.1420

[29] Hessels, A. J., Robinson, B., O'Rourke, M., Begg, M. D., & Larson, E. L. (2015). Building interdisciplinary research models through interactive education. *Clinical and translational science*, *8*(6), 793-799.

[30] Munteanu P. (2025), Hybrid learning and international cooperation: a policy framework for education in unstable times https://doi.org/10.21125/edulearn.2025.1063

[31] Tzanaki, E., Bessas, N., Vavougios, D., & Plagianakos, V. (2024). An Interdisciplinary Educational Proposal in Junior High School: The Fractal Geometry in Science, Computer Science and Art Lessons. *International Journal of Emerging Technologies in Learning (iJET)*, *19*(3), 35-45.

[32] Băltărețu, C., Costache, B., & Voinea, A. (2025). The Katch-McArdle Formula for TDEE Estimation: Applications in Sports Science and Bodybuilding Research. *International Journal of Education, Leadership, Artificial Intelligence, Computing, Business, Life Sciences, and Society*, *2*(02), 38-49

[33] Tosunöz, İ. K., Yıkar, S. K., Çerçer, Z., Kara, P., Arslan, S., & Nazik, E. (2021). Perceptions of interdisciplinary education and readiness for inter-professional education of nursing students: a sample of three different cities in Turkey. *Nurse education today*, *97*, 104673.

[34] Paduraru, M. E., & Budau, V. M. (2025). High school students' perception of the impact of participation in international educational projects on their career choice. EDULEARN25 Proceedings, 5191–5198. https://doi.org/10.21125/edulearn.2025.1305

[35]   Enachescu, 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 International, 15(2), 250.

[36]   Shen, Y., Martinek, T., & Dyson, B. P. (2022). Navigating the processes and products of the teaching personal and social responsibility model: A systematic literature review. *Quest*, *74*(1), 91-107.

[37]   Jiménez-Parra, J. F., Belando-Pedreño, N., López-Fernández, J., García-Vélez, A. J., & Valero-Valenzuela, A. (2022). "ACTIVE VALUES": An Interdisciplinary Educational Programme to Promote Healthy Lifestyles and Encourage Education in Values—A Rationale and Protocol Study. *Applied Sciences*, *12*(16), 8073. https://doi.org/10.3390/app12168073

[38]   Costache, B. (2025). Fostering resilience in the age of ChatGPT and artificial intelligence: integrating navy seal leadership principles into education to enhance student adaptability and performance. In EDULEARN25 Proceedings (pp. 4429-4429). IATED., https://doi.org/10.21125/edulearn.2025.1140

[39]   Powell, L. M., & Hendon, M. (2026). The Importance of Understanding Global Data Governance in an Interdisciplinary Research Methods Course. *Information Systems Education Journal*, *24*(1).

[40]   He, P., & Krajcik, J. (2026). Artificial intelligence in science education: global insights and future directions. *Disciplinary and Interdisciplinary Science Education Research*, *8*(1), 6.

[41]   Enachescu, V., & Staiculescu, C. (2024). Educational Management from Homogeneity to Diversity in Teacher Training. Revista de Management Comparat International, 25(3), 610-618.

[42]   Markauskaite, L., Schwarz, B., Novis-Deutsch, N., Papendieck, A., Arthars, N., Muukkonen, H., ... & Reimann, P. (2026, January). Advancing ecological conceptualizations of learning through studying world-making practices in interdisciplinary education. In *Proceedings of the 19th International Conference of the Learning Sciences-ISLS2025*. International society of the learning sciences.

[43]   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

[44]   Apine, E., Payo-Payo, M., Becker, A., Meschini, M., Matsoukis, C., & Kaffashi, S. (2026). Navigating interdisciplinary coastal research in the UK: Challenges and solutions from an early career perspective. *Cambridge Prisms: Coastal Futures*.

[45]   Suanto, I., Murhayati, S., & Yuliharti, Y. (2026). The Dynamics of Implementing E-Evaluation in Islamic Boarding Schools: A Solution-Oriented Study. *Interdisciplinary Social Studies*, *5*(2), 786-795.

[46]   Astuti, I. T. (2026). Effectiveness of Interdisciplinary Strategies in Addressing Public Health Challenges: A Quantitative Study. *Journal Interdisciplinary Health*, *2*(1), 19-26.

[47]   Enachescu, 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

[48]   Ruan, N., & Tang, L. (2026). Gender and Higher Education Research: An Interdisciplinary Review. *Reshaping Higher Education Research: Emerging Perspectives and Methodologies*, 169-192.

[49]   Liu, Z. J., Tretyakova, N., Fedorov, V., & Kharakhordina, M. (2020). Retracted Article: Digital Literacy and Digital Didactics as the Basis for New Learning Models Development. *International Journal of Emerging Technologies in Learning (iJET)*, *15*(14), 4-18.

[50]   Costache B (2024) Rethinking the training of teaching staff through the development of internship and mentoring programs, ICERI2024 Proceedings, pp. 5846-5852. https://doi.org/10.21125/iceri.2024.1419

[51]   Sengupta‑Irving, T. (2026). Attending to Hyperrationality as Unraveling Coloniality in Science Education: A Response to Davis and Philip. *Science Education*, *110*(1), 286-290.

[52]   Cicha, K., Rutecka, P., Rizun, M., & Strzelecki, A. (2021). Digital and Media Literacies in the Polish Education System—Pre- and Post-COVID-19 Perspective. Education Sciences, 11(9), 532. https://doi.org/10.3390/educsci11090532

[53]   Ramli, R., Sumiati, S., Pribadi, I., Athillah, F., & Pajarianto, H. (2026). Integrating Local Wisdom in Strengthening the Pancasila Student Profile. *Tafkir: Interdisciplinary Journal of Islamic Education*, *7*(1), 18-32.