

ESG Competences and Skills in Lifelong Education for Sustainability

Tatyana Odintsova

IDEA Academy,

Mosta, Malta

tatyana@ideamalta.com

Abstract. Sustainability paradigm being a global trend nowadays embraces not only a shift in problematics numerous areas of knowledge, but primarily a leap in mindset, which involves a revision of values and priorities for humanity at all. Thus, education for sustainable development and acquiring ESG (Environmental, Social, Governance) competences start to be a relevant drift in learning space. This area becoming a targeting for international regulation and an extensive part of educational services in response to labour market demands. This paper is focused on analysis of current state and prospectives of ESG education in EU. Based on the assessment of existing frameworks and stakeholders' needs an ESG-competences map was proposed. In this research a qualitative approach was applied. Thus, mostly secondary scholars' studies, databases, ESG and education regulatory documents and analytics, open access information from internet resources. Logical and comparative analysis was used for data processing. It was assessed educational models applying, content and institutional forms of existing ESG-programs, in higher education, specialists' upskilling, and lifelong education as well. There were considered main programs offered in education for sustainability and top ESG-skills required as far. Existing problems in education for sustainability were identified and a set of recommendations to develop lifelong acquiring ESG-knowledge system was provided.

Keywords: *ESG-education, Sustainability, Competences, Lifelong Learning.*

I. INTRODUCTION

The contemporary world is completely altering many basic concepts in all human life spheres. The turbulence of environment brings to the forefront new objects of attention in economy, social politics, corporative and state governance, education, science and knowledge creation, high technologies etc. Intangible forms of the capital are embodied in knowledge, human competencies, skills, and abilities. Knowledges and competences elaboration and managing underlies competitiveness, social progress, total human capital enhancing and sustainability.

Initially sustainability supposed harmonization of the economic development with the ecological concerns and United Nations Brundtland Commission in 1987 defined it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." For the moment, this idea developed into the global conception of humanity progress and well-being embracing economic growth, social responsibility, environmental concern, and new level governance approach, so far, the "Agenda for Sustainable Development" of UN defines 17 Sustainable Development Goals. This embodied in Sustainability concept set a wide scope of linked practices: such as green thinking, ESG informational and management assurance, responsible and impact investment, green skills, stability measurements and others. This paradigm led to a new outlook and changes in the research agenda, main highlights, questions to solve and methodology of a few sciences related.

Last time term "ESG" became popular and widely used, but it is incorrect to identify it with sustainability. These two notions, being closely related, nevertheless have certain and essential differences. Sustainability in a broad sense means long-term vitality of company, its ability to operate and develop providing not only economic efficiency, but also social responsibility and ecological safety in holistic policy to interplay these three considerations. ESG is a set of techniques and criteria to identify target indicators, evaluate and measure companies' performance in in environmental resilience, social-oriented policy, and proper governance approaches to ensure sustainable development. Whilst sustainability exposes company's commitments to universal human values in its activity and elevates them to the strategy, ESG converts them into measurable format to define ways implement this strategy and evaluate the extent to which it will be or has been achieved. It should be pointed out these concepts turns applicable not only to the company's level but might be extended to the branch, region, state as well.

Print ISSN 1691-5402

Online ISSN 2256-070X

<https://doi.org/10.17770/etr2024vol2.8091>

© 2024 Tatyana Odintsova. Published by Rezekne Academy of Technologies.

This is an open access article under the [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

Such a trend affects many practical and scientific areas – full range of information practices, starting from accounting which called to identify and show in reporting new untypical components, analysis and scoring to provide reliable ESG-data for stakeholders, “green” data quality assurance and other informational activities. One can define a big scope of linked control, compliance, finance and investment, managerial practices. It moves on the fore new gen of competences and skills coming relevant for companies, markets, territories, states and world community, individuals either looking for work, moving their career or just accepting new life values, mindset, and behaviour patterns for safe future. ESG-competences of employees start to consider as assets making important contributions to total human and organizational capital what leads to the intensive development education for sustainability (with ESG-learning as a part of it), driving knowledge and skills for people to provide new kinds of thinking. The concept embodies a wide scope of educational and learning practices targeting more than new competences and knowledge creation, rather setting on new kind of thinking and life priorities of humanity. Evidently the educational system remains the key element of this structure, but besides, the new paradigm extends spectrum of ways to spread and gain “sustainable” proficiency.

II. MATERIALS AND METHODS

This study based on the existing frameworks in sustainable education and professional training consideration and includes analysis of academic programs suggestion in Europe. A qualitative approach was applied, and logical and comparative analysis was used for data processing. There were used mostly secondary sources of information were used, particularly similar-topic scholars’ studies, databases, educational portals, regulatory documents and analytics, another open access information from internet resources. It was assessed educational models applying, content and institutional forms of existing ESG-programs, in higher education, specialists’ upskilling, and livelong education as well.

III. RESULTS AND DISCUSSION

Education for sustainable development (ESD) is continuing to be a new global trend in educational and knowledge area. According to the UNESCO this kind of education empowers learners of all ages with the knowledge, skills, values, and attitudes to address the interconnected global challenges we are facing, including climate change, environmental degradation, loss of biodiversity, poverty, and inequality. “ESD is a lifelong learning process and an integral part of quality education that enhances cognitive, social and emotional, and behavioural dimensions of learning. It is holistic and transformational and encompasses learning content and outcomes, pedagogy, and the learning environment itself” [1]. Moreover, being the main conductor of SDG in education, UNESCO stated the four main elements that should be transformed in the relevant agenda - pedagogy and learning environment, learning content, learning outcomes, societal transformation.

“Sustainable” education has been developing dynamically over the last two decades and brings to the fore a set of new issues and questions to solve. Particularly, “it remains a challenge for employers,

students, educators, and program administrators to clearly articulate what competencies these programs develop in students” [2], [3], [4]. Although hundreds of educational programs in the sustainability field have been launched, till now not are ambiguous understanding of alumni competences. “Proposals for sustainability competencies continue to be presented as lists of items [4], [5]. This makes difficult for the employers and labour market to determine competency needs. Notions of sustainable development skills and competences applying in educational practice and research not always clearly distinct [6].

A drift in education can be proved by plenty of international and European frameworks, regulatory and recommendation documents for “green education” development. The European Union contributed a vast base grounding new educational trend. There are numerous recent EU documents concerning education in sustainability that could be referred to and subjected to analysis. One of the substantial program documents in EU strengthening efforts towards ESG education, is the European Council recommendation of 16 June 2022 on learning for the green transition and sustainable development (2022/C 243/01) [7]. Referring to several important frameworks in Sustainability, this recommendation emphasizes the importance of learning for the green transition and sustainable development as one of the priority areas in education and training policies. Some of regulations noted there are directly related with educational and tied practices, amongst we can highlight the UNESCO Strategy Education for Sustainable Development 2021-2030 [1], related UNECE Framework for the Strategy Implementation [8], the Strategic Framework for European Cooperation in Education and Training Towards the European Education Area And Beyond 2021-2030 [9], European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience [10], European Competence Framework on Sustainability “Green Comp” [11], European Reference Framework of Key Competences for Lifelong Learning [12], Communication on a New ERA for Research and Innovation [13] and others. The trend is illustrated by unidirectional documents of voluntary associations, professional coalitions and NGOs developed beyond the official bodies and regulators. A good example of such “declarations of intent” calling under the sustainable education for business banner can be a global business coalition for education report (2022) “Unlocking Potential and Performance: Recognizing Education’s Position at the Core of ESG” [14].

All these documents affect matters of education for a sustainable world and colligating them can be highlighted main trends in European educational area for sustainability:

- prioritizing education for sustainable development for the near and long term,
- spreading idea of sustainability to promote conscious lifestyle and mindset, habits of responsible behaviour, consumption patterns, production, and life activities,
- creation of learning environment and motivation for lifelong studying,

- all possible forms usage and combining traditional education, training and upskilling, self-learning,
- providing opportunities for the ESG-knowledge and skills acquiring in formal, non-formal and informative options,
- applying both traditional and innovative approaches, transformative and interdisciplinary teaching, online and blended models, case studies, gamification, service learning, hackathons etc.,
- support of educators and developing their knowledge and skills, including research in education,
- jointing of education and research activities, innovative practices and smash experience dissemination in new knowledge making.
- active businesses' involvement to the ESG skills-creating programs for the employees and education programs investing.

There are a few indicators revealing that this leap is imminent. Firstly, one can note a high research interest in the issues of education for sustainability. According to Castellanos and Queiruga-Dios, "Europe is the continent with more research about ESD and 33.7% of the papers of the total search were dedicated to research on this subject on the continent or in European countries" [15].

A growing number and diversity of appropriate educational programs both in higher education and in professional retraining for companies and governance employees involved in sustainability agenda. Screening of programs web-suggested on allows to identify two major institutional forms for sustainability education – training programs in HEI (from bachelor's to doctoral level) and ESG - courses for professionals' training and certification. The first line of educational services provides a full range of programs in different areas of knowledge, merged by "sustainability" verbal semantic construct. "HEIs are seeing the value and importance of education for sustainable development in recent years" [16].

Analysis of few web-resources with databases of educational programs of HEI in Europe with built-in search engines shows high level of high education programs in sustainability studies popularity (mostly there are master's level programs). According to the data of <https://www.masterstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com> total number of master's programs on numerous aspects of sustainability in Europe is really extensive and vary depending on resource from 274 to 663 (Figure 1).

Degrees obtained by alumni of sustainability programs are mostly represented by Master of Science (from 57 to 76 percents in different databases, figure 2).

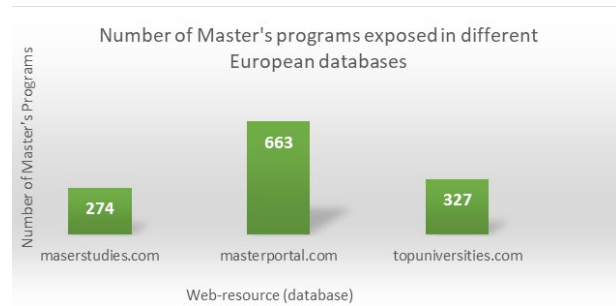


Fig. 1. Number of European Master's programs in sustainability studies in different databases (<https://www.masterstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com>)

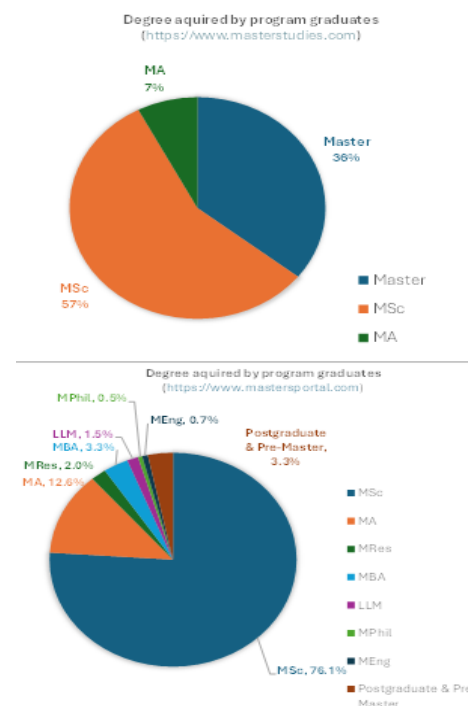


Fig. 2. Degrees of European Master's programs in sustainability alumni (<https://www.masterstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com>)

At the same time in Financial Times analytical review to assess sustainability education differences in quality and seniority possibilities were included only three masters' degree types: MBA, Executive MBA, or master's in management what is allocate sustainability education significance for the governance systems in business and behind [17].

Regarding study pace, format and programs' duration, European universities mostly suggest full-time education (73 – 83 %), campus-based (86 – 88 %) with terms up to 2 years (Figure 3). Thus, it is obvious that higher education in sustainability becomes an important part of educational space and covers a constantly growing share of the market.

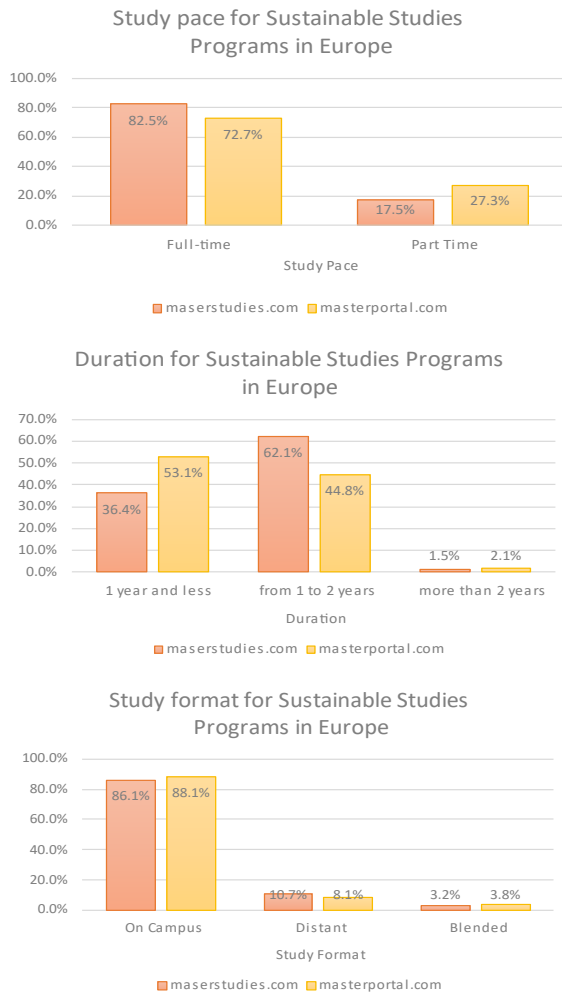


Fig. 3. Study pace, duration and study format of European Master's programs in sustainability (<https://www.maserstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com>)

Educational programs' focus and content embrace different areas of knowledge (figure 4). The most popular are programs in economic studies, including Sustainable Business, Sustainable Consumption, Sustainable Development and Sustainable Management.



Fig. 4. Main areas of knowledge of European Master's programs in sustainability (<https://www.maserstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com>)

The diversity of programs suggested confirms wide coverage of knowledge areas and growing interest to

higher education in sustainability, this can be slightly demonstrated by a tag cloud (Figure 5). And the paradigm of sustainability education supposes transdisciplinary approach, case-project approach and nurturing new thinking.



Fig. 5. Tag cloud for European Master's programs in sustainability (<https://www.maserstudies.com>, <https://www.mastersportal.com>, <https://www.topuniversities.com>)

The second popular way to acquire knowledge in sustainability is more typical for specialists who already have qualifications and work in various fields of activity but need the new relevant competences according ESG-agenda. High demand for this type of service is related to the real necessity of businesses and financial institutions to implement ESG-reporting and provide proper management practices. For instance there are popular courses with certificates CFA (Chartered Financial Analyst) Institute Certificate in ESG Investing, GRI (Global Reporting Initiative) Sustainability Reporting Certification, CDP (carbon Disclosure Project) Climate Change Course, ICA (International Compliance Association) Certified ESG Professional: Impact Leader Program, International Association for Sustainable Economy (IASE) PRI (Principles for Responsible Investment) Academy's ESG Integration Course, Sustainable Business Strategy Course of Harvard Business School and others. This courses' duration varies from few hours to several months and content are mostly embraces to a greater extent such scope: philosophy of sustainability and ESG approach, standards and reporting, ESG and sustainable finance, responsible investments, business-models etc.

Whilst analysing sustainable and ESG education current situation and perspectives we can note a few important discourses for consideration.

Primarily, even being grounded such a conspicuous base of declarative and supporting international documents, the main idea of transmission and acquiring knowledge and skills needed to promote Sustainable Development has not yet become a Maxim for most parties apparently to be involved. This is the issue of motivation, consciousness, and incentives for two major groups of the process - educators and learners, as well as other stakeholders' groups and institutions in. It is due to one of the still defying questions for the Sustainability agenda is a natural contradiction between green and social responsibility values and natural desire for financial gain

immanent for any economic system. This is confirmed by known facts of businesses' ESG usage mostly for the reputational goals in greenwashing, formal rather than substantive approach for "responsible" reporting, companies' rejection of non-mandatory reporting, disclosures, and management standards. Each paradigm should be accepted by most scientists and practitioners and define a way of related activities advancement for a certain stage of development. Till now one can face an opinion about some sustainability values artificiality and imposition for the "as usual" business, this reduces comprehension of ESG education importance as well. To make green thinking doctrinal not declarative it is necessary to create a mechanism of all businesses' real interest in valid movement to sustainability. It can be implemented by two main ways of stimulation combo: strengthening the mandatory ESG-regulatory component and green assets financial markets development by responsible and impact investments promotion.

Then, given the wide circle of stakeholders involved in the educational agenda for sustainability, we must define a scope of traditional and novel educational models that could be employed. With priority of formal education and training in secondary, higher education and vocational training, there are also can be applied non-formal modes such as extra-curriculum activities, online forms, youth engagement in volunteer, research and creative practices, hackathons, etc. Considering extensive adult audience of professionals, interested in receiving ESG-competences and knowledge, the models of upskilling, reskilling, online and blended courses, few-days intensives, workshops and case studies courses and many others could be engaged. And to for carry out the paradigm of green thinking important to provide educational practices embracing all the society circles, to incentive for "acquiring the knowledge, skills and attitudes needed to live more sustainably, changing patterns of consumption and production". It corresponds to the lifelong learning idea and maintain life skills excellence.

One of the key questions that must be considered in building ESG-education is range of competences and skills required in accordance with demands both of labour market of the day and for future skills map for sustainability managing in the long-term prospective.

Competences according to "Key Competences for Lifelong Learning" are a combination of knowledge, skills and attitudes "that people need to meet their professional, personal, and social needs" [6]. The OECD Future of Education and Skills 2030 project "defines competency as more than just "skills", but as "a holistic concept that includes knowledge, skills, attitudes and values [18]. Skills are a prerequisite for exercising competency. To be ready and competent for 2030, students need to be able to use them to act in coherent and responsible ways that change the future for the better". Sustainability competences can be defined as the knowledge, skills, values and attitudes that enable graduate students to cope with the complexity and uncertainty of sustainability issues in society [19].

TABLE 1 COMPETENCES FOR SUSTAINABLE DEVELOPMENT IN RECENT STUDIES

Source	Area of competence	Competence
Alberton et al., 2020 [21]	Manager's competences for sustainability	Focus on systemic thinking Preventive competence Normative competence Strategic competence Interpersonal competence
Ploum et al., 2018 [22]	Essential Sustainable Entrepreneurship Competences	Strategic management competence and action competence Embracing diversity and interdisciplinary competence Systems thinking competence Normative competence Foresighted thinking competence Interpersonal competence
Kleef & Roome, 2007 [23]	Competence in Innovation for Sustainable Business Management	Systemic thinking Learning and development Integrating business, environmental and social problems Developing alternative business models Networking and social capabilities Coalition and collaboration building
UNESCO. Education for Sustainable Development Goals: Learning Objectives [24]	Core sustainability competences	Systems thinking competence Future-orientated thinking (or anticipatory) competence Value-based thinking (or normative) competence Strategic thinking (or action-orientated) competence Collaboration (or interpersonal) competence
Wiek et al. 2011, 2016 [25, 26]	Key competencies in sustainability	Systems-thinking competency Anticipatory/futures-thinking competency Normative/values-thinking competency Strategic-thinking competency Interpersonal/collaborative competency Integrated problem-solving competency (meta-competency)
Katja Brundier et al. [4]	Refined key competencies in sustainability	Systems-thinking competency Anticipatory/futures-thinking competency Normative/values-thinking competency Strategic-thinking competency Interpersonal/collaborative competency Integrated problem-solving competency (meta-competency) Intrapersonal Competency/ Mindset Implementation competency
Laasch et al. [20]	Interdisciplinary Responsible Management Competences	Independent and interdependent 33 competences in domains: Being (Character) Becoming (Maturity) Acting (Action) Interacting (Relation) Knowing (Knowledge) Thinking (Analysis)

Competences’ analysis, presented in recent research shows a giant accent’s shift from professional to supra-professional competency-based approach. Numerous studies in this area tend to combine different kinds of competences to make them more comprehensive and sustainable-oriented, like in exploration of responsibility management competences in the study of Laasch et al. [20].

The list of competences for Sustainable development varies in different research and includes mostly abilities for new values moving, thinking, interaction, self-development, and knowledge appliance to create the resilient reality. Competences noted in some recent researches are in the Table 1.

Important step in direction towards competences in Sustainable development was elaboration of European Competence Framework on Sustainability, approved in 2022 and adopting four groups of competences: embodying sustainability values (valuing sustainability, supporting fairness, promoting nature), embracing complexity in sustainability (systems thinking, critical thinking, problem framing), envisioning sustainable futures (futures literacy, adaptability, exploratory thinking), acting for sustainability (political agency, collective action, individual initiative). Being systematical and comprehensive this approach can be used for further competences grounding and detailing. To develop competency model, we can use the following matrix (table 2).

TABLE 2 MATRIX OF COMPETENCES FOR SUSTAINABLE DEVELOPMENT

Elements of competence	Domains	Group of competences from Framework	Refined key competences/ Knowledge
Attitudes and Values	Being Acting	Embodying sustainability values	Mindset Values-thinking
Skills	Thinking Becoming Acting Interacting	Embracing complexity in sustainability Envisioning sustainable futures Acting for sustainability	Systems thinking Futures-thinking Values-thinking Strategic thinking Interpersonal/collaborative competency Integrated problem-solving. Implementation Intrapersonal Competency
Knowledge	Knowing		Economy Management Finance Governance Law Engineering Environment and ecology Education Sociology Psychology Digital technologies

IV. CONCLUSIONS

Education for sustainable development is becoming global reality and one of the main drivers of achieving humanity’s goals. Significance of this trend in Europe can

be confirmed by numerous documents and recommendations, emerging the legal framework and methodological ground for this performance, activity of the educational services market offering hundreds of higher education and training programs, and high level of communication between stakeholders in ESG area.

The most popular sustainability education models are higher education (mostly represented by master’s programs (approximately 80 % of universities’ programs suggested) and upskilling or reskilling programs for professionals aimed both at obtaining in a short competence required to solve practical tasks and certification by, international bodies and organisations, standard-makers and implementors. These models are different by objectives, terms, scope, main participants, and performance, it shows real need for different ESG-educational practices. Most of the programs existing for the moment are concentrated in the fields of economics, management, and governance, however ecological, engineering, digital, social, educational directions currently being actively developed.

Education for sustainability becomes more than just process of transfer and acquisition of knowledge, it starts to be a part of creation new mindset, consciousness, lifestyle and habits not only for individuals directly involved in ESG-management, but for all society. It is exactly the approach corresponding to the lifelong learning education concept. Therefore, it should include a much wider range of applying educational forms, techniques and competences formed.

Analysis of the competencies which should be formed by ESG-education conducted using recent researching materials, international and European regulations show that in the competency model should dominate not only special knowledge and hard skills rather sustainability attitudes and values, abilities to think and analyse, foresight and assess possibilities and threats, act and interact for implementation ESG-politics and self-develop. Achieving precisely these competencies is the main goals of ESG-education development.

ACKNOWLEDGEMENTS

The author thanks management of IDEA Academy (Malta) for organizational help in researching.

REFERENCES

- [1] UNESCO “Strategy Education for Sustainable Development 2021-2030”, 2020. [Online]. Available: https://www.env.go.jp/policy/entaku06_ref03_1.pdf [Accessed: Feb. 12, 2024].
- [2] M. Barth, J. Godemann, M. Rieckmann, U. Stoltenberg, “Developing key competencies for sustainable development in higher education”. *Int J Sustain High Educ* Vol. 8(4), pp. 416–430, 2007.
- [3] M. Rieckmann, “Future oriented higher education: which key competencies should be fostered through university teaching and learning?”. *Futures* Vol. 44(2), pp.127–135, 2012.
- [4] K. B. Barth, M. C. Gisela, M.Cohen, L.Diaz, S. Doucette-Remington, D. Weston, H. Geoffrey, and others, “Key competencies in sustainability in higher education—toward an agreed-upon reference framework”. *Sustainability Science*, Vol. 16(1), pp. 13-29, 2021.
- [5] S. Wilhelm, R. Förster, A. Zimmermann, “Implementing competence orientation: towards constructively aligned education for sustainable development in university-level teaching-and-learning”. *Sustainability*, Vol. 11(7), pp. 1891, 2019.

- [6] S.Montanari, , E. Agostini, D. Francesconi, “Are We Talking about Green Skills or Sustainability Competences? A Scoping Review Using Scientometric Analysis of Two Apparently Similar Topics in the Field of Sustainability”. *Sustainability*, Vol. 15(19), pp. 14142, 2023.
- [7] European Commission “Council Recommendation on learning for the green transition and sustainable development (2022/C 243/01)”, European Education Area. Quality education and training for all.[Online]. Available: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627(01)) [Accessed: Feb. 12, 2024].
- [8] UNECE “Framework for the implementation of the United Nations Economic Commission for Europe Strategy for Education for Sustainable Development from 2021 to 2030” [Online]. Available: <https://unece.org/environment/documents/2022/05/working-documents/framework-implementation-united-nations-economic> [Accessed: Feb. 20, 2024]
- [9] European Commission “Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030)” 2021/C 66/01 [Online]. Available: <https://op.europa.eu/en/publication-detail/-/publication/b004d247-77d4-11eb-9ac9-01aa75ed71a1> [Accessed: Feb. 20, 2024]
- [10] European Commission “European Skills Agenda for sustainable competitiveness, social fairness and resilience”, 2020 [Online]. Available: https://migrant-integration.ec.europa.eu/library-document/european-skills-agenda-sustainable-competitiveness-social-fairness-and-resilience_en [Accessed: Feb. 20, 2024]
- [11] European Commission “GreenComp The European sustainability competence framework, 2022 [Online]. Available: https://green-comp.eu/wp-content/uploads/2022/02/jrc128040_greencomp_f2.pdf [Accessed: Feb. 20, 2024]
- [12] European Commission “European Commission “Key Competences For Lifelong Learning”, 2019 [Online]. Available: <https://op.europa.eu/en/publication-detail/-/publication/297a33c8-a1f3-11e9-9d01-01aa75ed71a1/language-en> [Accessed: Feb. 20, 2024]
- [13] European Commission “A New ERA for Research and Innovation. Staff Working Document”, 2020 [Online]. Available: <https://op.europa.eu/en/publication-detail/-/publication/f8f19fc4-2888-11eb-9d7e-01aa75ed71a1/> [Accessed: Feb. 20, 2024]
- [14] A Global Business Coalition for Education Report “Unlocking Potential and Performance: Recognizing Education’s Position at the Core of ESG”, 2022 [Online]. Available: <https://gbc-education.org/resources/environmental-social-governance/> [Accessed: Feb. 20, 2024]
- [15] P.M. Acosta Castellanos, A. Queiruga-Dios, “From environmental education to education for sustainable development in higher education: a systematic review”. *International Journal of Sustainability in Higher Education*, vol. 23(3), pp. 622-644, 2022.
- [16] M. Dzurenda, “Leadership Development in Education for Sustainable Development: Evaluation of Higher Education Students in Sustainable Development Programs,” Dr. Ph. thesis, Coastal Carolina University, US, 2022.
- [17] Financial Times “In charts: Business school teaching on ESG” 2021 [Online]. Available: <https://www.ft.com/content/1177bd03-22a4-42e1-9d83-bec979755c4d> [Accessed: Feb. 20, 2024].
- [18] OECD Future of Education and Skills 2030, 2018 [Online]. Available: [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf) [Accessed: Feb. 20, 2024].
- [19] W.Lambrechts, P.Van Petegem, “The interrelations between competences for sustainable development and research competences”, *International Journal of Sustainability in Higher Education*, Vol. 17 (6), pp. 776-79. 2016.
- [20] O. Laasch, D.C. Moosmayer, E.P.Antonacopoulou, “The Interdisciplinary Responsible Management Competence Framework: An Integrative Review of Ethics, Responsibility, and Sustainability Competences”. *Journal of Business Ethics*, Vol. 187(4), pp. 733-757, 2023.
- [21] A. Alberton, A. P. Kieling, F. R. Lyra, E. M. Hofmann, M. P. V. Lopez, S. R. Stefano, “Competencies for sustainability in hotels: Insights from Brazil”. *Employee Relations: the International Journal*. Vol. 44 No. 3, pp. 555-575, 2020. <https://doi.org/10.1108/ER-01-2019-0093>
- [22] L. Ploum, , V. Blok, T. Lans, O. Omta, “Toward a validated competence framework for sustainable entrepreneurship”. *Organization and Environment*, Vol. 31(2), pp. 113–132, 2018.
- [23] J. A. G. Kleef, N. J. Roome, “Developing capabilities and competence for sustainable business management as innovation: A research agenda”. *Journal of Cleaner Production*, Vol. 15, pp. 38–51, 2007.
- [24] UNESCO “Education for Sustainable Development Goals: Learning Objectives”; UNESCO Publishing: Paris, France, 2017. Online]. Available: <https://unesdoc.unesco.org/ark:/48223/pf0000247444> [Accessed: Feb. 20, 2024]
- [25] A. Wiek, D.J. Lang, “Transformational sustainability research methodology”. In: Heinrichs H, Martens P, Michelsen G, Wiek A (eds) *Sustainability science: an Introduction*. Springer, Dordrecht, pp 31–41, 2016.
- [26] A. Wiek, L. Withycombe, C.L. Redman, “Key competencies in sustainability: a reference framework for academic program development”, *Sustain Science*, Vol. 6(2):, pp. 203–218, 2011. <https://doi.org/10.1007/s11625-011-0132-6>