

MODELING LANDSCAPE ARCHITECTS' COMPETENCES FOR SUSTAINABLE MANAGEMENT OF GREEN INFRASTRUCTURE

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Abstract. Green infrastructure management has social, environmental, and economic significance and is subject to regulation in accordance with sustainable development. Landscape architects play a key role in building and managing different green infrastructure components. The basic research goal in the present study is modeling the specialized competences of a landscape architect, applying the principles of sustainable development in establishing and managing a highly effective green infrastructure. The study presents the necessary educational competences which should be acquired by the landscape architecture graduates in order to be able to implement the principles of sustainable development regarding the landscape and the environment.

Keywords: competences, green economy, green infrastructure, green job, landscape architect, sustainable development.

JEL Classification: I23, O18, O21.

Introduction

Sustainable development of an environment in which individuals work, build their houses and relax is among the priorities of society. *Landscape architecture* and the product resulting from the work activities of *landscape architects* influence directly or indirectly the achievement of sustainable development aims such as: providing a healthy life; encouraging the wellbeing of individuals of all ages; constructing a sustainable infrastructure; supporting an integrating and sustainable industrialization that boosts innovations; developing and managing residential areas that are attractive, beautiful, safe and sustainable; taking urgent actions to combat the climate change and its impact; protecting and recovering land ecosystems and encouraging their sustainable development; managing forests sustainably and protecting biodiversity (Arnedo et al., 2021; Benedict & McMahon, 2002; Dragozova & Malkovska, 2017; European Council of Landscape Architecture Schools [ECLAS], 2010). Landscape architecture education is directed towards ensuring acquisition of knowledge that promotes inclusion and justice, while encouraging lifelong learning.

Green jobs are defined as jobs that decrease the impact of enterprises and economic sectors on the environment to levels that are sustainable (European Commission, 2014, p. 9; European Parliament, 2013).

Different international organization UNEP (United Nations Environment Programme), ILO (International Labour Organization), IOE (International Organisation of Employers), ITUC (International Trade Union Confederation) list the following examples for green jobs: jobs related to agriculture, production, research and development, administration and services which considerably contribute to the conservation and recovery of the environment. These are jobs which assist in ecosystem and biodiversity conservation, decrease energy, material and water consumption through highly effective strategies, aim at economy decarbonisation, minimize or fully avoid generating all forms of waste and pollution. In this sense, landscape architecture creates conditions for green jobs.

A *landscape architect* has a direct role in the green management (Landscape Institute, 2020; Dragozova-Ivanova, 2015; Maclean et al., 2018). The education of these professionals requires constantly improving its structure and content on the basis of the new realities

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with the aim of training highly-qualified landscape architects possessing competences for sustainable development (Sharky, 2016; Bowen, 2012; Valor et al., 2020).

In recent years, Bulgaria has been working hard to develop clear standards for practicing the profession and for educational training in the field of landscape architecture. This study's relevance reflects the need for educational competences in the field of sustainable development to be directly included in the cluster of competences of a landscape architect who is responsible for creating a sustainable green infrastructure.

The basic research goal of the present study is modelling a landscape architect's specialized competences that apply the principles of sustainable development in establishing and managing a highly effective green infrastructure.

The basic research methods are content analysis (of professional and educational standards in landscape architecture), system analysis and methods of modelling.

1. Literature review

1.1. Characteristics of the green infrastructure

In the context of what has been discussed so far, the calling of the landscape architect's profession with its characteristic labour specialization is to create, maintain and manage units of the green infrastructure.

The green infrastructure, in terms of its volume and purpose, is accepted as socially significant for achieving sustainable development and is a tool for applying the green economy principles (Davies et al., 2006; Benedict & McMahon, 2002).

It is precisely this significant connection between the landscape architect's profession and the products resulting from a landscape architect's knowledge, skills and competences that underlies the understanding of the importance of modelling the necessary competences for training highly qualified specialists. As an educational and scientific institution, a university has to realize the principles of sustainable development by applying interdisciplinary educational approaches that reflect the changing conditions of socio-economic development (ECLAS, 2010; International Federation of Landscape Architects EUROPE [IFLA Europe], 2019; Leal Filho et al., 2021; Paligorov et al., 2009; Dragozova-Ivanova et al., 2016; Maclean et al., 2018). An important part of a landscape architect's education is knowledge of the characteristics of the green infrastructure and its components.

The basic principles (EC, 2014) which are followed in constructing the green infrastructure are: accessibility, spatial vision, multifunctionality, benefits for nature and the society, biodiversity, sustainability and integrity. Applying them all contributes to the proper and adequate development of the green infrastructure network. The scope of application in terms of scale is linked to urban and non-urban infrastructure (in terms of landscape). The green infrastructure network is part of a wider ecological network and is subject to different ecological characteristics. These characteristics depend on the

specific elements of the landscape, as well as on the economic, social, environmental and even cultural benefits it provides.

There are various components of the green infrastructure on the basis of the scope and scale of application (EC, 2014; Malkovska & Dragozova, 2018a). Examples are:

- protected areas under Natura 2000;
- healthy ecosystems and territories with high environmental value which are outside the protected areas, such as bay territories, swamps, coastal zones, natural forests, etc.;
- elements of the natural landscape such as small watercourses, forests, hedges, which may serve as eco-corridors for wildlife;
- multifunctional zones with several functions within one territory. For example, land use which combines the maintenance or restoration of healthy ecosystems with other activities such as recreation.

The analysis of the different interpretations of the meaning of the term "green infrastructure" pays special attention to the accessibility to components of green infrastructure (Malkovska & Dragozova, 2018b).

1.2. Specifics of the landscape architect's practical work

In practice, a landscape architect impacts different components of the green infrastructure by applying the basic principles of sustainable development in constructing green infrastructure. A subsequent step of this study was to outline the characteristics of the landscape architect's profession that make it a socially significant one belonging to the definition of a green job.

The work of a landscape architect is linked to constructing an environment based on ecological, aesthetic and social-economic principles providing people with quality living conditions in their various life phases of work, recreation and sports (Dragozova-Ivanova, 2015). One of the main elements in assessing the well-being of society is the built infrastructure and the conditions that ensure good physical and mental health (EP, 2013). The main part of this infrastructure are the products resulting from a landscape architect's practical work. Landscape architects are the specialists who: manage, plan, construct and maintain the green spaces in cities; develop plans and programs for the natural sites outside the residential areas; assess and analyse the ecological indicators of the environment they create; control the environmental protection practice in residential and non-residential areas, etc. The essence of landscape architects' work provides indisputable evidence that the profession is essential for the health and life of people, and is important for society and for improving the public well-being (Kanchev & Miteva, 2016; McGrath & Powell, 2016; Pavlova, 2018). Therefore, it is only logical for the landscape architect's profession to be associated with the concept of a green job, and this is one of the professions that provides and will provide jobs with green and sustainable characteristics in the future.

Considering the above, competences for sustainable development are related to the development of skills that support the growth of the green economy or “green skills for green jobs” (Strietska-Ilina et al., 2011). Green jobs are defined by Strietska-Ilina et al. (2011, p. 4) as “jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable”.

As a result of the studied literature sources (Varghese et al., 2018; Strietska-Ilina, 2011; Stoyanova & Harizanov, 2015; Sharky, 2016; Sern, 2018; Van der Ree, 2019), this study adopts the concept of a green job in the context of the principles of the five principles of the Green Economy (McGrath & Powell, 2016; Green Economy Coalition [GEC], 2020, pp. 12–18):

- *The Wellbeing Principle*. The Green economy is directed towards the people and focuses on wealth leading to a better wellbeing.

A landscape architect’s profession focuses on planning and managing investment projects, and it is a landscape architect’s obligation to improve the access to sustainable natural systems, including the green infrastructure. Their knowledge and education are important and necessary for improving public wellbeing.

- *The Justice Principle*, which refers to the fair distribution of possibilities and results, reducing the difference between people and at the same time providing equal access to natural resources. Considering the specifics of the features constructing the green systems’ volume and structure, landscape architects apply in their work the principles of equality and access to the green infrastructure of every individual.
- *The Planetary Boundaries Principle*. The Green Economy must protect, restore and invest in Nature. A significant part of a landscape architect’s profession is connected with innovations in constructing, managing and preserving natural systems, with attention to their properties and specific features.
- *The Efficiency and Sufficiency Principle*. Following this principle, landscape architects propose environmentally sound designs that bring maximum benefits to a community, while ensuring proper land use.

On the grounds listed above, it can be stated that a landscape architect’s profession is a socially significant activity aiming at the realization of the green economy principles and creating opportunities for green jobs.

Figure 1 presents the 5 Principles of the green economy through adopted symbols (GEC, 2020).



Figure 1. The 5 Principles of Green Economy (source: GEC, 2020)

2. Methodology

The object of this study is the cluster of educational competences of landscape architects and managers of green infrastructure in a master’s and doctoral degree programs at the University of Forestry in Bulgaria.

Figure 2 shows the general scheme of the research methodology.

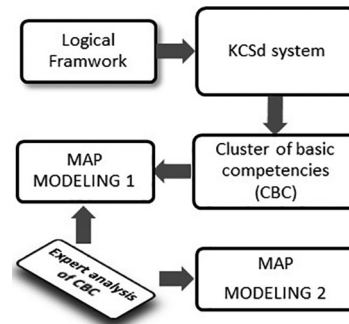


Figure 2. Research methodology

The main steps for modelling the educational competences are:

- Outlining the basic characteristics of the landscape architect’s profession which define it as a socially significant and green job having a considerable role in the achievement of sustainable development (SD).
- Analysing the content of the term “green job” in the context of the principles of the green economy.
- Identifying the specifics of the green infrastructure related to a landscape architect’s competences involved in its creation, management and preservation, which are the *Key Competences for Sustainable Development (KCSd)* of the landscape architect.
- Identifying the clusters of educational competences for sustainable management of the green infrastructure at a master’s degree level.
- Upgrading the educational and scientific competences for sustainable management of the green infrastructure at a doctoral degree level.

3. Competences maps modelling

The analysis of the educational and professional standards emphasizing the green job’s aspects involved in a landscape architect’s practical work led to modelling clusters of educational competences which ensure a higher level of work performance. A publication by Wiek et al. (2011) identifies five main groups of *key competences needed to achieve sustainable development (KCSd)*:

- Systems-thinking competence (STC);
- Anticipatory competence (AC);
- Normative competence (NC);
- Strategic competence (SC);
- Interpersonal competence (IC).

Modelling maps of educational competences on the basis of the analysis of the master’s and doctoral

Landscape Architecture degree programs followed the principle of acquisition by the students of knowledge, skills and competences in sustainable development and green management. Table 1 and 2 present a Modelled map 1 of the Key competences for Landscape Sustainable Development for the master's degree program accordance with Wiek et al. (2011)'s five groups of KCSd. The main groups of competences that are subject to modelling are:

- Personal competence (Table 1) – self-reliance and responsibility (SRC); competence for study (CS); communicative, pragmatic and strategic competence (CPSC) and
- Professional competence (Table 2) – basic competences for the landscape architecture profession (BCP); specific competences for the landscape architecture profession (SCP); technical competence for use of professional technologies and methods (TC); competences for planning, organizing, managing, and financing projects (CPM).

Table 1. Modelled Map 1 – Personal competences in the five groups of *Key Competences for Sustainable Development* (KCSd)

Educational competences Profile of a master's degree		KCSd
<i>Landscape Architecture</i> degree program		
Personal competences		
SRC	<ul style="list-style-type: none"> - To realize an objective research and systematic information - To participate in the taking of argumentative group decisions and to take individual decisions - To observe law, legislative and methodical decisions in the professional realization - To be responsible and to observe the ethical principles of the profession - To contribute to the conservation of the environment and the sustainable development 	STC
CS	<ul style="list-style-type: none"> - To aim at acquiring knowledge through lifelong learning - To acquire up-to-date knowledge in connection with changing information technologies - To enhance work practices in a changing environment - To aim at understanding and solving problems by adopting an integral approach 	SC STC
CPSC	<ul style="list-style-type: none"> - To work in a team effectively - To follow exactly instructions - To communicate with colleagues, the different governmental and municipal institutions successfully - To perform planned and/or assigned tasks successfully, responsibly, on time and in accordance with the established standards - To demonstrate an ability to professionally present project ideas and solutions to clients or various community groups - To demonstrate responsible attitude and to observe the ethical principles of the profession in work teams or groups 	IC SC NC

A map of key competences was modelled that includes the necessary basic competences for sustainable development and green management for the master's degree program in landscape architecture. Table 1 and 2 presents summary data elaborated in detail in additional working documents.

Figure 3 presents the results of the expert analysis of these main group of competences – personal competences, included in the modelled map of the master's degree program in Table 1.

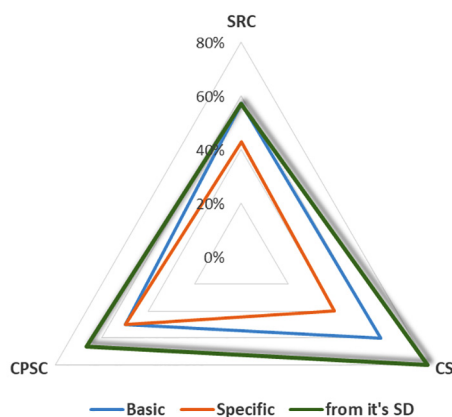


Figure 3. Key competences in % of personal competencies (Table 1) in the field of SD.

The analysis in the Figure 3 presents degree of competence (in %) in the field of sustainable development which is formed using the modelled map of competences.

Table 2. Modelled Map 1 – Professional competence in the five groups of *Key Competences for Sustainable Development* (KCSd)

Educational competences Profile of a master's degree		KCSd
<i>Landscape Architecture</i> degree program		*
Professional competence		
BCP	<ul style="list-style-type: none"> - To draft project documentation for the construction and maintenance of green areas - To carry out empirical research and to analyse the data - To demonstrate knowledge of plant biology and ecology - To draw up plans, projects, small models, drafts, visualizations, qualitative and quantitative estimations, project schedules - To coordinate the project implementation - To participate in urban planning - To participates in investment projects 	STC NC AC
SCP	<ul style="list-style-type: none"> - To manage the construction of green infrastructure units - To manage a team of different professionals - To manage the process of data accumulation, drafting of project decisions, project financial documentation 	

End of Table 2

Educational competences Profile of a master's degree		KCSd
SCP	<ul style="list-style-type: none"> - To manage the storage of documents for all stages and phases of the investment process - To presents to the top management - To manage the construction of urban green infrastructure units and of natural sites of national and local significance - To monitor urban planning and investment projects - To manage the process of urban planning of land for use as a park or for recreation - To demonstrate a responsible attitude towards the environment - Ability to manage large projects for the development of the territory, including all processing and documents in the construction and maintenance of objects of the green construction - To develop final reports and present them to the top management 	STC SC NC AC
TC	<ul style="list-style-type: none"> - To demonstrate a high level of understanding of principles, terms, techniques, procedures and practices in landscape architecture - To demonstrate the ability to apply knowledge - To identify problems and to work towards their solution - To show knowledge and to apply the existing legislation, local standards and procedures of institutions - To show an ability to use information technologies in landscaping design 	STC AC
CPM	<ul style="list-style-type: none"> - To have the ability to meet deadlines - To draft projects, to research and to analyse research results - To demonstrate an ability to adhere to work schedule - To be flexible and adaptable to work tasks' changes - To demonstrate consistency in scheduling projects and customer orders - To analyse and interpret financial information - To prepare account documentation and specifications 	AC SC

Figure 4 presents the results of the expert analysis of the main group of competences – professional competences, included in the modelled map of the master's degree program in the Table 2. The analysis in figure presents degree of competence (in %) in the field of sustainable development which is formed using the modelled map of competences in the field of landscape architecture professional competences.

The analysis presents the degree of competence in the field of sustainable development which is formed using the modelled map of competences. The figures show that a significant part of the acquired competences by a landscape architect in the master's degree program focus on sustainable use of resources, green thinking and socially responsible attitude towards the environment.

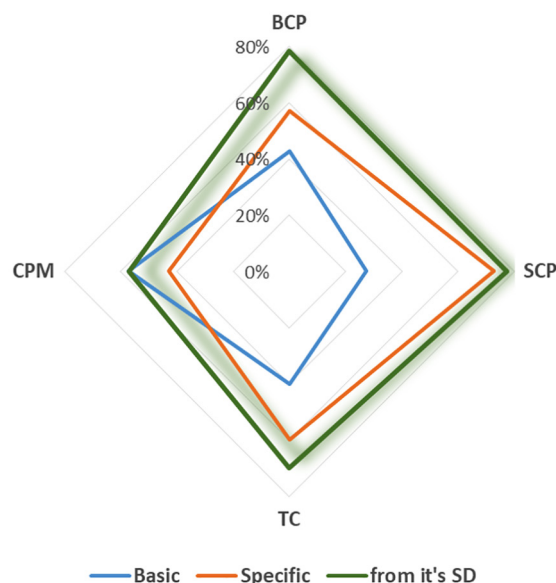


Figure 4. Key competences in % of professional competencies (Table 1) in the field of SD

These competences are expanded with key skills and knowledge to be obtained in the doctoral degree programme in the field of economics and management of a sustainable green infrastructure in University of Forestry.

The Modelled map 2 of the profile of competences for the doctoral degree program in Economic and Management in the Landscape Architecture Practice is presented in Table 3.

Table 3. Modelled Map 2 for key competences included in a doctoral degree program in the field of landscape architecture

Educational competences Profile of the doctoral degree program in Economics and Management in the Landscape Architecture Practice		KCSd
Personal competences		
SRC	<ul style="list-style-type: none"> - To establish and interpret new knowledge based on research and scientific activity - To demonstrate an ability for self-evaluation based on scientific achievements - To implement scientifically valuable research projects 	SC
CS	<ul style="list-style-type: none"> - To continuously acquire considerable knowledge for modern scientific practical achievements in the field of economics and management of landscapes as well as the organization and management of forestry and green infrastructure - To self-study through lifelong learning 	STC SC AC
CPSC	<ul style="list-style-type: none"> - To demonstrate a high level of personal responsibility and initiative in complex and unexpected circumstances in professional and social environments - To design and implement projects to generating new knowledge to be applied in science and practice 	

End of Table 3

Educational competences Profile of the doctoral degree program in Economics and Management in the Landscape Architecture Practice		KCSd
CPSC	- To successfully communicate in social situations in some of the commonly used foreign languages	IC AC STC
Professional competences		
BCP	- To manage, design and develop techniques and methods for scientific research	SC NC AC STC
SCP	- To manage and develop scientific research and development projects and to implement effective control	NC
CPM	- To manage, monitor and organise the production processes in state and private enterprises in the field of landscape architecture in concordance with the newest achievements	SC
	- To manage and perform marketing research	NC
	- To manage and develop educational programmes, lectures and scientific projects in universities, colleges and schools interested in green and sustainable development issues	STC
	- To organise and manage the use of natural resources	
TC	- To perform expert evaluations in the field of landscape architecture economics and management	SC
	- To present scientific ideas and conclusions both to specialists and non-specialists in the relevant fields	

Obtaining a doctoral degree in the field of economics and management is of particular importance for the acquisition of knowledge, skills and competences for sustainable development. Such a degree requires further knowledge accumulated through a problem-oriented approach to competence acquisition not only in the profession field, but also in the field of science. Therefore, the presented modelled map for key competences included in a doctoral degree program in the field of landscape architecture in Table 3 aim at an even closer connection with the groups of key competences necessary for the realization of sustainable development in green infrastructure.

The presented research covers the modelling of educational competences and the creation of Modelling maps for the both studied educational degrees for graduates of landscape architecture in Bulgaria. The work on verification in practice and between stakeholders of the Modelled maps continues in the future research.

The practical benefits of research can be summarized in two directions:

- supporting the process of standardization and regulation of the profession of landscape architect;
- applying educational approaches for competence-

based training for acquiring knowledge and skills for sustainable management of green infrastructure.

The theoretical implication of the results of the present study is that within Bulgaria for the first time a scientifically based approach is used to study the compliance of the competences for landscape architect in the context the *Key competences for Sustainable development* of green infrastructure.

Conclusions

The basic conclusions from the analysis and the realized process of modelling the key educational competences for sustainable development of the green infrastructure and a sustainable environment are:

The labour specialization of the landscape architect's profession is closely connected with the term 'green job', and this is one of the professions which, in the future, will ensure green and sustainable solutions for the aims of effective and modern management of the green infrastructure in urban and non-residential areas;

A map of key competences was modelled that includes the necessary basic competences for sustainable development and green management for the master's degree program in landscape architecture;

These competences are further expanded with key skills and knowledge to be obtained in the doctoral degree programme in the field of economics and management of a sustainable green infrastructure.

This study presents the necessary educational competences which graduate students must have acquired in order to be able to successfully apply the principles of sustainable development and the green infrastructure in managing the landscape and the environment.

The main contribution of the presented research would be to support the intensive activities in recent years in Bulgaria regarding the introduction of standards for regulating the profession of landscape architect. The work on verification in practice and between stakeholders of the Modelled map 1 and 2 continues in second period of project and to be element in the future research and publication.

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References

- Arnedo, E. G., Valero-Matas, J. A., & Sánchez-Bayón, A. (2021). Spanish tourist sector sustainability: Recovery plan, green jobs and wellbeing opportunity. *Sustainability*, 13(20), 11447. <https://doi.org/10.3390/su132011447>
- Benedict, M. A., & McMahon, E. T. (2002). Green infrastructure: Smart conservation for the 21st century. *Renewable Resources Journal*, 20(3), 12–17. <https://www.merseyforest.org.uk/library/?q=Green+Infrastructure%3A+Smart+Conservation+for+the+21st+Century>

- Bowen, A. (2012). "Green" growth, "green" jobs and labor markets (World Bank Policy Research Working Paper No 5990). <https://ssrn.com/abstract=2018164>
- Davies, C., MacFarlane, R., McGloin, C., & Roe, M. (2006). *Green infrastructure planning guide* (Final report). <http://www.scribd.com/doc/33007993/Green-Infrastructure-Planning-Guide>
- Dragozova, E., & Malkovska, P. (2017). Green infrastructure projects – priority investment. *Management and Sustainable Development*, 5(66), 6–10. http://oldweb.ltu.bg/jmsd/files/volumes/msd_66.pdf#page=10
- Dragozova-Ivanova, E. (2015). Professional social responsibility of management in the cities' green systems. *Burgas Free University Annual*, 32, 185–193. <http://research.bfu.bg:8080/jspui/handle/123456789/639>
- Dragozova-Ivanova, E., Paligorov, I., Ivanov, I., & Kovacheva, S. (2016). Management modelling for forest landscapes. *Economics and Business*, 28(1), 90–97. <https://sciendo.com/pdf/10.1515/eb-2016-0013>
- European Commission. (2014). *Building a green infrastructure for Europe*. Directorate-General for Environment. Publications Office. <https://data.europa.eu/doi/10.2779/54125>
- European Council of Landscape Architecture Schools. (2010). *Guidance on landscape architecture education. Tuning landscape architecture education in Europe*. Version 26. ECLAS. http://www.unideusto.org/tuningeu/images/stories/Summary_of_outcomes_TN/ECLAS_Guidance_on_Landscape_Architecture_Education.pdf
- European Parliament. (2013). *Eco-innovation – jobs and growth through environmental policy*, P7_TA (2013)0584. https://www.europarl.europa.eu/doceo/document/TA-7-2013-0584_EN.pdf
- Green Economy Coalition. (2020). *Principles, priorities and pathways for inclusive green economies: Economic transformation to deliver the SDGs*. <https://www.greeneconomycoalition.org/assets/reports/GEC-Reports/Principles-priorities-pathways-inclusive-green-economies-web.pdf>
- International Federation of Landscape Architects EUROPE. (2019). *CHARTER*. IFLA Europe. https://www.iflaeurope.eu/assets/docs/Charter_on_European_Landscape_Architect_2019.pdf
- Kanchev, I., & Miteva, A. (2016). Analysis and evaluation of the implementation of policies to promote creation of green jobs in Bulgaria. In *International Scientific Conference The Priority Directions of National Economy Development* (pp. 39–46).
- Landscape Institute. (2020). *Landscape Institute entry standards and competency framework – Professional competencies*. <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2020/12/LI-Entry-Standards-and-Competency-Framework-Professional-Competencies.pdf>
- Leal Filho, W., Levesque, V. R., Salvia, A. L., Paço, A., Fritzen, B., Frankenberger, F., Damke, L. I., Brandli, L. L., Ávila, L. V., Mifsud, M., Will, M., Pace, P., Azeiteiro, U. M., & Orlovic Lovren, V. (2021). University teaching staff and sustainable development: An assessment of competences. *Sustainability Science*, 16(1), 101–116. <https://doi.org/10.1007/s11625-020-00868-w>
- Maclean, R., Jagannathan, S., & Panth, B. (2018). *Education and skills for inclusive growth, green jobs and the greening of economies in Asia*. Springer. <https://doi.org/10.1007/978-981-10-6559-0>
- Malkovska, P., & Dragozova, E. (2018a). Survey of green infrastructure management experience in different countries. In *RTU 59th ISC Economics and Entrepreneurship SCEE'2018 Proceedings* (pp. 54–62). Riga. <https://wpweb-prod.rtu.lv/feem/wp-content/uploads/sites/64/2019/05/SCEE2018-Proceedings.pdf#page=54>
- Malkovska, P., & Dragozova, E. (2018b). Alternatives for development in green infrastructure projects. *Journal of International Scientific Publications: Ecology & Safety*, 12, 341–349. <https://www.scientific-publications.net/en/article/1001758/>
- McGrath, S., & Powell, L. (2016). Skills for sustainable development: Transforming vocational education and training beyond 2015. *International Journal of Educational Development*, 50, 12–19. <https://doi.org/10.1016/j.ijedudev.2016.05.006>
- Paligorov, I., Dragozova-Ivanova, E., & Kovacheva, S. (2009, June). Specific features for analysis, evaluation and design of posts in higher education. In *VII International Scientific Conference „Management and Engineering'09”*. Scientific Proceedings, Jan XVII, 3(113), 260–265. Sozopol, Bulgaria.
- Pavlova, M. (2018). Fostering inclusive, sustainable economic growth and "green" skills development in learning cities through partnerships. *International Review of Education*, 64(3), 339–354. <https://doi.org/10.1007/s11159-018-9718-x>
- Sern, L. C., Zaime, A. F., & Foong, L. M. (2018). Green skills for green industry: A review of literature. *Journal of Physics: Conference Series*, 1019(1), 012030. <https://doi.org/10.1088/1742-6596/1019/1/012030>
- Sharky, B. (2016). Green infrastructure and sustainable design. In Sharky, B., *Thinking about landscape architecture: Principles of a design profession for the 21st century*. Routledge. <https://doi.org/10.4324/9781315726939>
- Stoyanova, Z., & Harizanova, H. (2015). Perspectives of development of green jobs in Bulgaria. *Economics of Agriculture*, 62(2), 369–384. <https://cyberleninka.ru/article/n/perspectives-of-development-of-green-jobs-in-bulgaria/viewer>
- Strietska-Ilina, O., Hofmann, C., Haro, M. D., & Shinyoung J. (2011). *Skills for green jobs: A global view*. International Labour Organisation. http://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_159585/lang-en/index.htm
- Valor, C., Antonetti, P., & Merino, A. (2020). The relationship between moral competences and sustainable consumption among higher education students. *Journal of Cleaner Production*, 248, 119161. <https://doi.org/10.1016/j.jclepro.2019.119161>
- Van der Ree, K. (2019). Promoting green jobs: Decent work in the transition to low-carbon, green economies. *International Development Policy*, 11, 248–271. Brill Nijhoff. <https://doi.org/10.4000/poldev.3107>
- Varghese, G., Gupta, S., & Sharma, K. (2018). Sectoral approaches to skills for green jobs in India. In *Changing the Indian Economy* (pp. 141–153). Elsevier. <https://doi.org/10.1016/B978-0-08-102005-0.00008-3>
- Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science*, 6, 203–218. <https://doi.org/10.1007/s11625-011-0132-6>