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# Development of the green entrepreneurial mindset through modern entrepreneurship education

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**Abstract.** Entrepreneurship education programmes are slowly adapting to the circularity and sustainability movement. Business education lacks experiences in introducing sustainability and environmentally-friendly business topics into entrepreneurship study programmes. This article aims to research the inclusion of environmental and sustainability issues in the entrepreneurship education programmes in order to promote a green entrepreneurial mindset among students and acquire green business activities. The COVID-19 crisis has thrown a harsh spotlight on a range of sustainable development challenges, and the choices the community makes now in its path to recovery will shape the trajectory of sustainable development for years to come. Also, usage of digital technologies will become crucial in this green transition. The empirical research was based on the evaluation of a survey of 657 undergraduate students from the business administration sphere. The research results are of practical, social and scientific significance by exploring the green movement and its impacts on the entrepreneurship education curricula and their effects in developing a green entrepreneurial mindset of students.

## 1. Introduction

Entrepreneurial activity is seen as an important driver for employment growth, strengthening economic dynamics, and innovation in European countries [1]. The competitiveness of the economy and well-being of individuals are increasingly dependent on an educated society, where universities and their academic staff play an important role in the learning process of students and adults – participants of courses [2].

The promotion of pro-environmental behaviour [3] of business students is an important aspect in the light of future green transition of European countries. The importance of this shift towards sustainable development and green business has been recognized by the European Green Deal Strategy and the Sustainable Development Goals of the United Nations. Although some companies with green and circular business models have shown rapid growth over the past 10 years, they still represent a relatively small share of the economy. Sustainable development is often given other denominations such as: “green,” “environmentally-friendly,” “eco-conscious”, where the meaning depends upon the context, situation, and social setting, as well as cultural, environmental, and financial impacts. Nevertheless, education and awareness-raising are the key elements in developing the pro-environmental behaviour of entrepreneurs and society as a whole in order to reduce the environmental impact [4]. The fast-changing socio-economic environment, aging labour force, migration, digital technological advancements, and a path of sustainable development require that education and training programs address these rapidly changing needs of youth and adults in order to improve their skills in entrepreneurship and life sciences [5].



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The purpose of the article is to explore the adoption of environmental and sustainability issues in the entrepreneurship education curricula in order to promote a green entrepreneurial mindset and green business activities. The topicality of this issue is prescribed by a necessity of modern study programs in entrepreneurship education, providing not just core skills essential for business practices, but also horizontal “green” driven competencies that form the green entrepreneurial mindset of business students.

This paper contains the results of a scientific literature review which is significantly important in preparing new study programs that promote the green business mindset and entrepreneurial abilities. Areas and risks have been clarified to harmonize the study programs according to the rapid development challenges and requirements of the green transition within the business environment. The conclusions of this study highlight issues which need to be investigated further.

## **2. Characteristics of entrepreneurship and green business**

The entrepreneurship contribution to productivity and growth of the economy, innovations, and the employment generation were investigated through the centuries by Schumpeter [6], Knight [7], Kirzner [8], and Baumol [9]. Nowadays a considerable amount of literature around the world investigates the phenomena of entrepreneurship [10; 11; 12; 13; 14].

Salinas and Barroso [10] emphasize that entrepreneurship is one of the key players in the national economy for any country. Ahmad and Seymour [15] highlight the importance of the ability to find and take advantage of business opportunities and an intention to understand the behaviour of the entrepreneur. These factors are seen as key drivers stimulating individuals to become entrepreneurs. Barroso [16] distinguishes between the creator and an entrepreneur, where the first just creates a business idea, but the entrepreneur takes the risk to transform the business idea into products and commercializes them into the market. Drucker [17] stresses that outstanding entrepreneurs may notice and use existing business opportunities instead of just waiting for the potential of new creative business ideas. In contrast to inventors of ideas, entrepreneurs are active in the discovery-learning process by constantly looking around, listening, and exploring new business opportunities.

Researchers Feldman and Bolino [18] believe that the intention to become an entrepreneur depends on the will of the individual, his perception of the value of outcomes, and the potential economic impact. Also, environmental, sociodemographic, and societal benefits are important to some extent. Katz [19] underlines the importance of entrepreneurship in increasing the efficiency level of individuals. Researchers argue that personal economy and academic level also have influence in the process of entrepreneurship [20; 21].

In recent decades, various studies have emerged that discuss the role and contribution of small firms to the economy, with large firms transforming into smaller and more stable business models. Several studies show that improving competition as the number of companies increases directly contributes to growth, as an increase in the number of companies ultimately leads to an increase in employment, as competition creates a favourable environment for knowledge growth, leading to the next economic booster [13; 12].

The increasing societal pressure on the environmental challenges encourages the development of the green business, where, besides the monetary value creation, environmental concerns are recognized and assumed [22]. From a wider socio-economic perspective businesses are the largest consumers of various resources and consequently creators of negative environmental effects through the generation of waste and pollution [23].

Although the value capturing and maximization of a profit is a core aim of any business, the way and process of this value creation depends on the personality of an entrepreneur. Some entrepreneurs prefer linear growth and expansion, which means targeting the increase of production and a volume of product sales in the market, also requiring larger resource consumption. Other entrepreneurs consider the introduction of new business models which are based on resource-efficient, environmentally-friendly, and sustainable principles [24]. Sadovska and co-authors [24] highlight that in future business models sustainability or green values will be equal to the creation of financial value. The

OECD [25] has confirmed that entrepreneurs will have to change their processes, approaches, and values and consider environmental values much more, because new business risks related to environmental and climate change challenges will appear in the future.

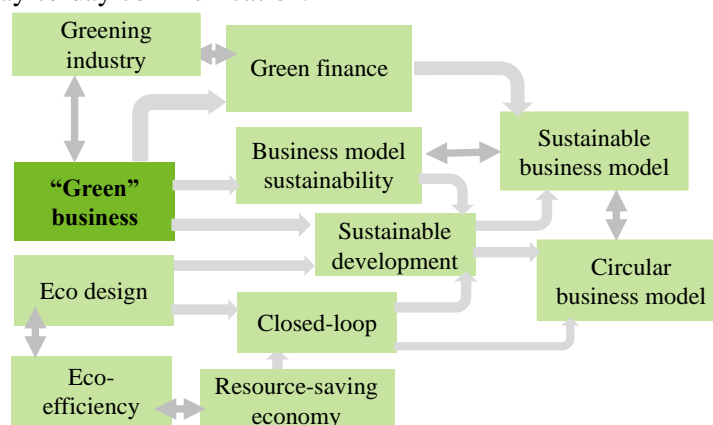
Researches on the green business became more active in the last two decades of the previous century. This movement in entrepreneurship studies was influenced by environmentalists through discussions about limited resources, increasing pollution, and waste [26; 27]. Furthermore, there were also active scientific discussions about green business among economists and strategic management researchers. The Porter hypothesis argued strongly that environmental and economic values are not conflicting, but promoting the competitiveness of companies [28]. The scientists confirmed that the introduction of environmental requirements in the company promotes the development of new products and other innovations, improves resource efficiency, and increases productivity [29; 30; 31].

Researchers continued their studies related to environmental effects from green business and proposed new concepts such as environmentally-responsible manufacturing or decision making [32; 33] use of “green branding” and green business values to improve the reputation of companies [34]. Newton and Harte [34] defended the idea that environmental concerns from a business perspective should be feasible and financially viable. The voluntary belief or adherence to environmental values is a rather theoretical assumption, but entrepreneurs are looking for economic effects that at the same time justify investments and activities to eliminate environmental problems.

In the 21st century, researches have introduced such concepts as eco-design and eco-controlling, environmental total quality management, resource-saving economy, sustainability, lifecycle assessment, and others [35; 36; 37]. In the context of environmental issues, business practitioners and researchers increasingly discuss sustainable business models. In addition, in recent years the possibilities of digitalization of various business processes have become especially important in the discourse on sustainability and the green business movement. Through empirical researches, scientists investigate the micro-business level by questioning how and if green businesses improve the performance and competitiveness of companies [38; 39; 40; 41; 42].

A relatively new concept, which has grown rapidly over the past five years, is related to the circular economy and circular business models. Circular business models promote strategies that close or narrow the resource loops by applying “reduce, reuse and recycle” principles [43; 44]. Companies with circular business models adopt economically-justified solutions that extend the life of products, as well as develop technological innovations for the recycling of end-of-life products in new ones with higher value-added.

The evolution of the green business and associated concepts are shown in the mind map (Fig.1). While currently, professionals tend to use specific terminology for the description of the environmental aspects in the business, the majority of society is not familiar with specific concepts, such as the circular economy, and prefer using the terms “green” or “environmentally-friendly” businesses in their day-to-day communication.



**Fig. 1.** Mind map of the evolution of green business and related concepts, created by the authors

Jayashankar with co-authors [45] renames green entrepreneurs as “ecopreneurs” emphasizing that they are motivated to create financial and non-financial benefits, which are also related to social and environmental dimensions. The benefits of a “green business” (Table 1) can be described with economic, environmental, and social factors [46; 47; 48].

Scientists emphasize the important role of business leaders in identifying, adopting, and implementing environmental values in companies. As a result, the question arises as to how and when business leaders acknowledge and accept such environmental values. Newton and Harte highlight that every entrepreneur has different boundaries and limits of values and morals to assume environmental principles [34]. This proves the importance of education and raising awareness about environmental and sustainability issues among entrepreneurs and business leaders.

**Table 1.** Benefits of “green business”, created by the authors

<b>Economic</b>	<b>Environmental</b>	<b>Social</b>
Resource efficiency and reduction of costs	Compliance with environmental regulatory requirements	Improvement of reputation by using green branding strategy
Minimisation of business risks and associated losses or costs	Positive environmental impact and reduction of ecological footprint	Improvement of health and safety for employees
Increase of turnover through new revenue streams	Use of renewable resources and waste disposal or recycling	Improvement of dynamic capabilities to innovate
Simplifying production by excluding unnecessary components or packaging	Enhancing the sustainability principles in the whole supply chain	Use of local resources contribute to job creation for local people
Introduction of new products and new technologies	Preservation of natural resources	Satisfied and returning customers, long-term relationship
Increase in profitability and competitiveness	Increase in awareness of environmental challenges	Collaboration between stakeholders and societal involvement

In recent decades environmental values are also becoming increasingly important in the whole of society. Consumers will change their environmental perception and will encourage companies to assume and introduce green business practices [25]. The shift from traditional to green business will become an important issue in the future agenda of entrepreneurs. While currently there is emerging interest in the sustainable and circular business among practitioners of this field, entrepreneurs lack the ability and knowledge on how to adopt green business practices and combining them with the advantages of the digital economy [49; 48; 24]. The importance and the need for the knowledge of entrepreneurs about the development of sustainable and environmental-friendly solutions with digitalised various business processes, as well as the green and circular business will increase. Furthermore, the environmental knowledge and environmental concerns of both entrepreneurs and customers is an issue requiring intelligent and appropriate “green branding” strategies and communication from companies [50].

This issue has become particularly relevant during the existing COVID-19 crisis when the social and health challenges of individuals should be balanced with the societal sustainability issues, in particular, the availability of disinfection and appropriate medical tools, social distancing restrictions, and most sustainable business solutions supplying emergent needs.

### **3. Sustainability and green issues within entrepreneurship education**

Considering the importance of entrepreneurship as the main driver of economic growth, entrepreneurship education programs have been created to provide business skills, competencies, and entrepreneurial mindset. Rarely do these study programs stimulate sustainable values, a green business mindset, and pro-environmental behaviour [51; 52; 53; 54].

Universities play a significant role in the emergence of new businesses and the commercialization of innovations, also towards the green business movement and eco-innovations [55]. The improvement of entrepreneurship-stimulating study programs and teaching methods are essential to make business studies more interactive and practical. The involvement of students and teachers in business plan competitions, business clubs, hands-on training in start-ups and existing companies, starting businesses as part of the study course, business simulation games, design thinking, and reflective practices are some of the modern teaching methods that promote the development of the entrepreneurial mindset [56; 57; 58; 59; 60].

Entrepreneurship education is beginning to move towards the broader social and environmental responsibilities of society. Business schools have recently made progress on preparing students as tomorrow's leaders, equipping them with skills and knowledge from sustainability perspectives. Within European countries, the importance of environmental knowledge and concerns at university level was particularly emphasized for the transition to sustainable development [61].

The personal engagement and motivation of students, their understanding of the mindset of entrepreneurs, self-efficacy, enthusiasm, willingness to take a risk, and proactive approach are important. Entrepreneurship study programs must satisfy modern needs and comply with the current peculiarities of the business-creation process, such as turning towards green business, environment protection, circular economy, and sustainable development [62]. Universities should teach more about achieving holistic progress towards more sustainable development, resource-efficient consumption, sufficiency behaviour, waste reduction, and creation of sustainable business practices in their future careers [63].

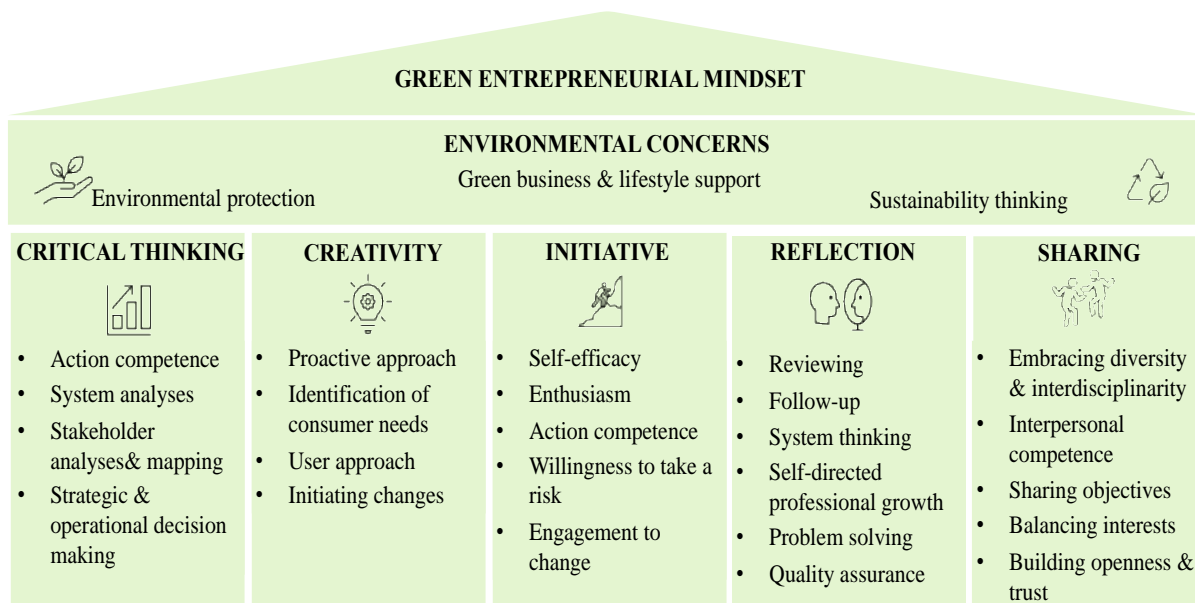
The examination reveals that business leaders attempt four corporate social responsibility main errands: focused direction, arriving at a shared view, piloting new actions and unique tasks, and embedding results. Furthermore, the following capabilities were discovered to be vital: system thinking within the framework of the system dynamics, grasping variety and interdisciplinarity, interpersonal relational ability, management of dynamic processes, and maintaining strategic foresight [47].

One of the entrepreneurship education purposes in the light of the EU strategy towards sustainable and green entrepreneurship is promoting a sustainable mindset in students that they are able to develop new green business ideas that are feasible and financially viable [61].

Within this context there are the following necessary competencies in entrepreneurship study programs: sustainability thinking, system analyses, identification of consumer needs, initiating an engagement to change, stakeholder analyses and mapping, both strategic and operational decision-making, building openness and trust, sharing objectives, and balancing interests [64]. There is a common set of competencies necessary for starting a business and developing a green business. Environmental concerns and related knowledge play an essential role in forming the green business mindset (Fig.2).

#### **4. Research methods**

In order to conduct the research, the literature review was performed by searches of the related theoretical literature in Elsevier ScienceDirect, Scopus, Web of Science, and Google Scholar with related keywords “green business”, “sustainable business”, “circular business”, “entrepreneurial education”. In addition to recognized scientific databases, Google Scholar was used due to the fact that high impact scientific publications in the field of circular and sustainable business are emerging just in the recent decade. While in parallel, Google scholar provides a large collection of applied researches published by practitioners and international organizations, contributing significantly to the knowledge building and know-how in this field. Based on the investigation of literature sources, the conceptual framework, research design, and limitations were elaborated in more detail. The content analyses allowed us to explore key concepts in this field. Further, through investigating the references of the first round of desk research, the authors used the snowball method to collect additional literature sources more specifically reflecting concepts related to research questions.



**Fig. 2.** Competences of the green entrepreneurial mindset, created by the authors

For empirical research, the systematic data collection was organized through a survey from 2017 to 2020. Students and adults enrolled in academic and adult education programs were surveyed. In total 657 students were involved in the competency self-assessment before and after the study course. Students represent universities of more than 20 European and Eastern Asia countries. The self-assessment questionnaire was developed assuming the training evaluation model of Kirkpatrick [65].

Additionally, 3 focus group discussions were organized involving entrepreneurship education and “green business” experts. Focus group discussions expanded the findings and conclusions of this research, developed suggestions, and to further research issues. The descriptive analyses were used to synthesize all research findings. The key findings and ideas of this research were visualized using mind maps and other design-thinking methods.

**5. Research results and discussions**

The problem associated with green business development can be investigated from two discourses. One is more generally related to the ability of entrepreneurship students to start a business. The second, closely linked to the first, is the competence and ability to develop green business ideas and adopt green practices into the business model of a company.

This study highlights a certain trend that business start-ups are more open to green business model innovations and integration of environmental values into business processes. This, in turn, is more difficult for existing established companies. In such companies, the integration of environmental values often requires fundamental business process innovations and a significant change of mindset of managers and employees. In turn, green start-ups can adopt environmentally-friendly business processes immediately if they personally possess environmental concerns, values, and knowledge. This has also been confirmed by other researchers [66].

The curriculum for the development of a green entrepreneurial mindset is multidisciplinary as it covers various topics from overall entrepreneurship to more specific ones, such as the circular economy and circular business models, eco-design and sustainable development, environmental protection, resource efficiency, and others. Apart from the overall entrepreneurship study courses, the study process includes an elective course on Green Entrepreneurship.

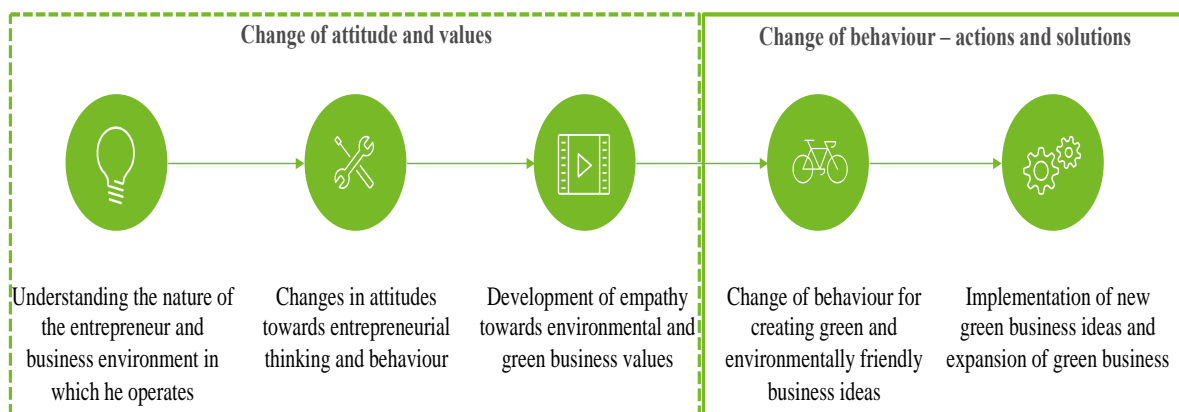
Several methods are used in the study process, which encourages students to understand the nature and principles of the green business (Fig. 4). Students conduct case studies, seeking out and analysing good practice examples of local and international companies applying green business practices. A



circular business model canvas [67] was used to structure the case studies. By filling in such a canvas students emphasize the green elements of business models, for instance, the green value proposition, pro-environmental policies and procedures in main business activities, green branding and green marketing strategies, revenue streams from green business activities, and others. The circular business model canvas contains 9 business model elements. Through these canvases, students are encouraged to critically analyse if and how green aspects are emphasized in each business model element.

The next step, after exploring green business examples and benchmarking best green business practices, is the use of creative and design-thinking methods, which is where teams of students develop their own green business ideas. Sometimes, students choose already successfully implemented business ideas and by integrating new green principles into the business model elements, create a new perspective and innovative green business ideas. An element of visualization is essential in creative-thinking methods; students draw their ideas on posters, depicting the customer, product prototypes, and roadmaps of a product from the company to the customers. These visualisations ensure a stronger sense of “touch and feel” effect regarding their own green business ideas, and increase personal empathy towards green business values.

To promote the pro-environmental change of behaviour, students are involved in green business simulation games, where students must take responsibility for different roles simulating green business management and decision-making. The annually-organised international hackaton “Hack the Waste”, which is devoted to the reduction of waste, is a good example. Students may experience what it really means to implement green principles in the company. Simulation games allow us to test and develop both entrepreneurial business competences and green business mindset in a comparatively short time.



**Fig. 3.** Dynamics of the entrepreneurial and green business knowledge and mindset-building, created by the authors

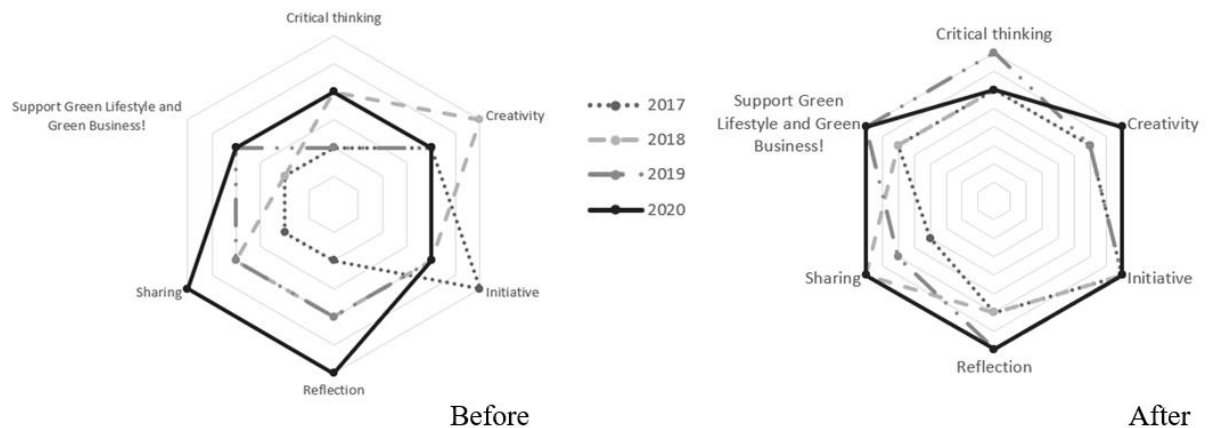
During the study process students performed self-assessment on a scale from 1 to 4 for their competencies before and after the study course. Fig. 4 shows the results of the last four years. The average indicators show that students' confidence has increased after the study course. The figure shows that all competencies have increased. The study process has significantly contributed to the development of the green entrepreneurial mindset of students.

The research demonstrates changes in self-assessment by looking at the dynamics of responses of respondents over the years. For example, in the years 2017 and 2019 at the beginning of the course the self-assessment for Critical Thinking corresponded to “With the support from teacher or instructions I am able to conduct research, understand the results and evaluate the credibility of information sources found”.

In 2019, by defining the highest self-evaluation level, “I am able to independently conduct research, understand different subjects, to analyse different sources of information and to find interconnections”. In comparison, in the years 2018 and 2020 at the beginning of the course the self-



assessment corresponded to, “I am able to conduct research and summarize the information available, but I still need support to analyse information more thoroughly and develop conclusions”. Consequently, there were no changes at the end of the course. This allows for the conclusion that students understand the need to work on improving their capabilities and improve knowledge.



**Fig. 4.** Students' self-assessment of their competencies before and after the study course on Green Entrepreneurship

Competence Sharing received the highest level of self-assessment “I always express my opinion and I am able to defend and argumentatively substantiate any idea in different manners”.

Competence Initiative received the highest evaluation in each year by, “I am able to undertake leadership in different tasks if I receive support from friends”, and by beginning evaluation, “When we begin new initiatives or things in the classroom I like to undertake the role of a leader. I usually suggest new ideas for activities.”

As for Reflection, the evaluation levels differ year by year. In 2018 and 2019 by, “I am able to describe what I have learned and determine what factors improved my learning experience”, but in 2017, “I am able to remember how the learning process and what was my role in it”. Consequently, in the years 2019 and 2020, at the end of the course, the highest self-evaluation level was, “I am able to determine what I need to study more in order to improve my knowledge and competences”.

The highest self-assessment in creativity competence is, “I am able to easily think of new ideas and I know multiple ways how to execute them”, at the beginning of the study course that was set in 2018 and 2020 at the end of the study course.

Self-assessment of competence Support Green Lifestyle and Green Business has increased in all of the years included in this research; at the beginning the assessment was, “When preparing presentations and creative tasks I prefer when there are clear instructions from the teacher”, and “I have ideas for creative tasks but I prefer it if there is a predefined plan. I need support to execute them”, and “I am able to generate ideas easily and to think of something new, but I prefer to work collectively”. There has been an increase in the self-assessment level to, “I am able to think of new ideas independently and I know some ways how to execute them. I enjoy sharing my ideas to others”.

The research and analysis are continuous in order to improve the study course and facilitate the mindset of an entrepreneur. OECD [25] has confirmed that adoption of circular business models and green business practices will be further stimulated by the advancements of the digital economy and new technological solutions, emerging new business risks that raise environmental concerns, employee health and safety issues, as well as changing consumer values that support the green lifestyle. The relevance of green business will increase as new generations, especially Y and Z generations, enter the market as customers, for whom green values are especially important. New generations will increasingly demand a green value proposition from companies, which will motivate

companies to change their operating principles towards the green and circular economy. In order to maintain a long-term balance between the technosphere and the environment, the emerging technological advances will play an indispensable position in the sustainability growth, therefore the relationship between green and digital economies should be further assumed.

## 6. Conclusions

The promotion of pro-environmental behaviour of business students is an important aspect in the light of future green transition of European countries. One of the entrepreneurship education purposes in the light of the EU strategy towards sustainable and green entrepreneurship is promoting a sustainable mindset in students.

The current study provides support to research previously carried out in other countries regarding the essential competencies necessary for future green entrepreneurs. Different terminology is used by green entrepreneurs, ecopreneurs, etc., but it is clear that environmentally-friendly solutions are becoming more and more popular and attractive. Innovative technologies and digitalization of business processes will provide much wider possibilities for entrepreneurs to be environmentally oriented.

Teaching is a creative process, which allows the latest theoretical achievements and their practical applications to be combined. This paper may be considered as an introduction to sustainability of entrepreneurial education and acquisition of green business activities in the study process and the authors would welcome colleagues to share their experience in teaching the sustainable development and green issues.

Self-assessment of students' knowledge at the beginning and end of study course on the Green Entrepreneurship makes it possible to judge the correctness of the chosen methods. The results of the research show that as a result of studies, competencies have increased in all areas, thus it would be recommended to include this study course as compulsory in Entrepreneurship programmes. In further research, the authors will analyse students' responses by country and student age group, paying special attention to the teaching methods used.

Assuming the topicality of the green and circular economy in recent years, the promotion of a green entrepreneurial mindset of students has to become a multi-disciplinary issue which is included not just in the specific specialised study course Green Entrepreneurship, but horizontally applied. Particular topics of green concepts have to be included in the syllabus of other general (A) and specialised (B) study courses of the bachelor and master study programmes; for example, Business Management, Economics, Finance Management, Project Management, and Business Plan. Also, the intensification of field-related specific study courses, for instance, Civil and Environmental Protection, Green Economy, Sustainability, Green Investments and finance, and Circular Economy are an essential base for forming the green entrepreneurial mindset of students. The inclusion of these green topics in other study courses does not require specific accreditation and is an internal decision for each higher education institution that considers further strategic importance of the shift towards environmentally-friendly and sustainable development goals. The studies of the courses mentioned should be combined with the green business simulation activities as much as possible to promote the change of behaviour of students to create and run businesses with an environmentally-responsible attitude.

Digital technologies play an essential position in accomplishing long-term stability and sustainability goals within the environmentally-friendly manner. The impact of the digital economy on the transition towards the green economy shall be acknowledged and further investigated. These issues are important and should be included in the syllabus of the Green Entrepreneurship study course in the future. Moreover, the current COVID19 crisis has greatly accelerated the need for modernisation and digital transformation of education systems across Europe.

The topic of the green business mindset is a complex concept, but it will become more and more important in everyday decisions at all levels of businesses, and even households, thus the demand for education about the green and circular economy developing appropriate skills and abilities will rise.

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