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Full Length Research Paper

Inclusion of green economy and sustainability programs in higher education institutions: Examining the case of Kenyatta University, Kenya

Innocent Osoro Ngare^{1*}, Dorcas Beryl Otieno¹, Emma Atieno Ogutu¹, Duncan Ondieki Omwami¹, Amos Atima Marang'a², Edwin Odhiambo Otieno¹, Salome Wairimu Gikonyo¹ and Lamech Owino Opiyo¹

¹UNESCO-Chair, Higher Education Development for Green Economy and Sustainability (HEDGEDS), Kenyatta University, P. O. Box 43844 – 00100, Nairobi, Kenya.

²Department of Mathematics, University of Nairobi, P. O. Box 30197-00100 Nairobi, Kenya.

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Higher education institutions play a pivotal role in instilling green economy and sustainable development principles in students. There are complex environmental challenges, and breaking through this complexity necessitates the incorporation of green economy learning to assist students in understanding these complex connections. This study explores the inculcation of interdisciplinary learning at the Master's level of assessed green economy aspects among ten schools. It explores green economy topics in courses and the degree of action-oriented learning. Results from the total respondents (N=227), indicate, among the existing green aspects in sampled schools, the sustainable use of natural resources (n=108, 47.6%) thematic area was the most dominant across the Master's courses. Examination of green learning in schools shows a disparity amongst schools where the school with the most examined green aspects was engineering and technology (93.8%) with the school of economics as least examined (75%). Cumulatively, green aspects, even with skewed disparity, were taught across the ten schools ($p = 0.000$). It is recommended that university programs should enhance regular reviews of curriculum and coursework in different disciplines, to set precedence on emerging green economy studies and their relevance.

Key words: Green economy, interdisciplinary learning, higher learning institutions, green skills, action-oriented learning, sustainability.

INTRODUCTION

For over ten years, the green economy has remained a topic of interest that has gained momentum among academicians and global leaders (Odiyo et al., 2022).

The term "green economy" refers to an economy that is low-carbon, resource-efficient, and socially inclusive (Ngare et al., 2022; Dmuchowski et al., 2021). In a green

*Corresponding author. E-mail: ngare.innocent@ku.ac.ke.

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economy, public and private investment in economic activities, infrastructure, and assets that allow for lower carbon emissions and pollution, improved energy and resource efficiency, and the preservation of biodiversity and ecosystem services drives employment and income development. For academicians, what has become increasingly of interest is the need for education for sustainable growth (Chaleta et al., 2021). Agenda 21 acknowledges the value of including the higher education sector in the quest for a lasting environmental solution (Nordén and Avery, 2021). In the quest to equip individuals with the knowledge, ability, values, and attitude needed to live in, develop, and support consumption and resource-efficient societies with sustainable modes of production and consumption, institutions of higher learning continue to be an opportunity to explore (Handayani et al., 2021). As a result of this, we have witnessed the emergence of "green campuses," or institutions that incorporate green practices into their everyday operations in order to reduce their carbon footprint while fostering long-term growth. These institutions provide centers for students to create a multifunctional approach to environmental sustainability through curriculum creation, teaching and research, facilities and operations, student participation, governance and administration, and finally community involvement (Ribeiro et al., 2021). On the 20th and 22nd of June 2012, the United Nations Conference on Sustainable Development (Rio+20) was held in Rio de Janeiro, Brazil. It resulted in a targeted political outcome paper that includes clear and actionable steps for achieving sustainable development (Soltau, 2021). By this time, environmentalists believed that the interventions were behind schedule, and that if we were to address a pressing global issue like climate change, global leaders needed to first track the execution of the Sustainable Development Goals. It has been more than 20 years, but as important as the green economy seemed then, and still seems now, there is still a lot that needs to be done to get countries started. Changing institutions and putting in place regulatory, tax, and economic policies, among other things, is one way to do this, but educational reform is even more important (Ali et al., 2021).

Green economy learning skills in universities

For the world to transition to a low-carbon economy and achieve social, environmental, and economic sustainability, green skills are needed. Green skills first appeared with the invention of green technologies; whereby green skills were required for operations. This now shows why it is important to embrace green skills in today's development (Rosenberg et al., 2020). Green skills are the abilities, knowledge, values, and attitudes needed to achieve sustainability. Green skills will help learners prepare for jobs in industries other than their

current one. Green skills are essential for green jobs that contribute to preserving the quality of life, the environment, and social economic equity (Sern et al., 2018). Changes in demand in the labor market result from a green economy. According to the literature, there is currently a low workforce with green skills, and many of these green skills are required in various sectors to promote sustainability. Although the job industry sectors require these green skills, most of the learning institutions have not yet included green skills learning in their learning strategy. Inadequate response to green skills training in educational institutions has far-reaching consequences for industries and the economy as a whole (Lotz-Sisitka and Ramsarup, 2019). In most developing countries, governments and institutions of learning have failed to address the green skills challenges that come with environmental issues and climate change. This shows that the training system is often isolated and this impacts negatively on the greening of industries and the green economy. The academic community has identified the need for green skills to facilitate the transition towards a green economy (Pavlova, 2018). Most occupations require green skills in order to appreciate the demands and issues that come with the greening of economies. According to a study conducted by the Organization for Economic Cooperation and Development (OECD)...ref, most countries have implemented environmental-related training programs, but have not included green skills in their learning strategy, particularly in developing countries, and Kenya is not an exception. Incorporation of green competencies should embed the teaching, educating, and professional competencies that are vital to promote the establishment of relevant strategies that contribute to green skills in learning institutions (Diep and Hartmann, 2016). There is a high demand for green skills in the fields of vocational education, universities, colleges, and also curriculum development. Additionally, there is less appropriate content for curriculum and design in the learning tasks in regards to green skills training. The curriculum of the learning institutions fails to meet the needs with respect to green skills. According to Kamis et al. (2016), 21st century green skills are essential and they are included in the list of skills that learners require to compete in the globalization era. The green economy has the ability to influence skills in green development, green technology development, and the development of green skills among workers. However, there are several green skills challenges that exist in training and education programs that require urgent action, one of them being inadequate capacity, resources, and inadequate support from relevant governments.

Interdisciplinary learning and green economy studies inculcation

According to Sikand et al. (2021), interdisciplinary learning education offers a collaborative approach that

Table 1. Student participation across ten schools.

Sampled Schools	Response (n)	%
School of pure and applied science	20	8.81
School of public health and applied human sciences	21	9.25
School of humanities and social science	21	9.25
School of hospitality, tourism, and leisure studies	21	9.25
School of engineering and technology	16	7.05
School of economics	20	8.81
School of environmental studies	41	18.06
School of creative and performing arts, film and media studies	20	8.81
School of agriculture and enterprise development	27	11.89
School of business	20	8.81
Total	227	100

Source: Authors

helps approach multifaceted topics. Learners require interdisciplinary knowledge so as to solve complex challenges and problems of the 21st century, such as climate change and environmental pollution. Green economy has a capacity that provides a comprehensive and strong interdisciplinary approach based on environmental science rather than being in the sub-set of economics however it has gained a slow intake (Bassachs et al., 2020). Severity of environmental crises requires a more radical curriculum, and this implies that a model of interdisciplinarity teaching in institutions is required.

Higher education institutions play a critical role in educating students about the importance of a green economy and long-term sustainability. It is necessary to teach students about the green economy in order to fully comprehend these complex connections in the environment (Krishnan and Nandhini, 2020). The transition to a green economy has sparked the development of green skills so as to fulfill the requirements of green-collar employees. Green economy education and teaching will act as a catalyst for graduates to enter the green job market. Elements of green learning need to be applied as early as possible to students so as to make them competent citizens in all aspects and to maintain environmental balance (Thirupathy and Mustapha, 2020). For green economy studies to be taught at learning institutions, new educational curricula are required so as to help professionals develop appropriate skills and knowledge. There are currently few university courses developed that deal with green economy, indicating a significant gap and the need for more green economy study courses and learning in institutions. Although many higher education institutions around the world began introducing environmental-related programs, sustainability and green economy aspects have recently become a hot topic. According to Wang and Teng (2019), education in the twenty-first century must prepare students to face

interconnected social, economic, and environmental problems. This now calls for interdisciplinary learning among students to foster a green economy and a sustainable future.

METHODOLOGY

Scope

The study was conducted at Kenyatta University targeting postgraduate students. The university has a total of seventeen schools that embed interdisciplinary learning in their curriculums and research. A descriptive research survey design guided the study targeting over 50% of total seventeen schools in the institution where, 10 schools (58%) took part. Approximately 300 respondents were targeted, where only 227 respondents responded to the survey through systematic random sampling, giving 75.6% response rate. A response rate above 70% (≥ 0.7) is reliable when conducting field research studies (Amirrudin et al., 2021).

Distribution of schools' response index

The response indexes for the ten schools were as follows; School of pure and applied science (8.81%), School of public health and applied human sciences (9.25%), School of humanities and social science (9.25%), School of hospitality, tourism, and leisure studies (9.25%), School of engineering and technology (7.05%), School of economics (8.81%), School of creative and performing arts, film and media studies (8.81%), School of business (8.81%), and School of agriculture and enterprise development (11.89%) (Table 1).

Sampling and exclusion criteria

The study purposively sampled schools. Schools with more than three departments and at least four postgraduate programmes were selected. Master's students were randomly selected from the ten schools with a requisite being an ongoing student in a respective masters programmed at Kenyatta University.

Data collect and analysis

Closed ended questionnaires with key thematic areas on green

Table 2. The extent schools offered green economy and sustainability courses.

Green economy topics in courses	DK		N		SL		M		Si		SD
	n	%	n	%	N	%	n	%	n	%	
Globalization and sustainable development	12	5.3	12	5.3	34	15	95	41.9	74	32.6	1.077
Education for sustainable development	7	3.1	5	2.2	72	31.7	72	31.7	71	31.3	0.990
Green economy	10	4.4	56	25	55	24.2	61	26.9	45	19.8	1.175
Environmental policy and management	7	3.1	25	11	63	27.8	62	27.3	70	30.8	1.109
Land ethics and sustainable agriculture	10	4.4	45	20	75	33	58	25.6	39	17.2	1.107
Urban ecology and social justice	13	5.7	43	19	72	31.7	70	30.8	29	12.8	1.084
Environmental philosophy	20	8.8	46	20	77	33.9	43	18.9	41	18.1	1.202
Population, women and development	7	3.1	33	15	55	24.2	75	33	57	25.1	1.103
Renewable energy	13	5.7	29	13	70	30.8	55	24.2	60	26.4	1.176
Green design/architecture	26	11.5	51	23	37	16.3	73	32.2	40	17.6	1.292
Green financing/investment	26	11.5	43	19	47	20.7	61	26.9	50	22	1.312
Sustainable use of natural resources	10	4.4	21	9.3	35	15.4	53	23.3	108	47.6	1.184
Promoting creation of green jobs	17	7.5	35	15	45	19.8	60	26.4	70	30.8	1.275
Green innovation and technology development	18	7.9	33	15	36	15.9	68	30	72	31.7	1.281
Reduction of environmental health risks	8	3.5	28	12	68	30	53	23.3	70	30.8	1.143

DK-Don't Know; M-Moderately; N-None; SL-Slightly; SD-Standard Deviation.
Source: Authors

economy and curricula were coded on Google Docs and a unique link was generated that was shared across the postgraduate Master's students. To participate in the study, each postgraduate student had to use their Institution Identification Document (ID) and corporate email to register and activate the link and activate survey questionnaire. This limited any probable duplication or participation of data collection exercise twice in addition, to observe World Health Organization protocols against COVID-19 infections and spread (Turke et al., 2021). Data are analyzed descriptively with identifiable frequencies and percentages and presented through tables and figures. Further statistical test on examining of green economy aspects in curriculum for Masters programmes was done by Chi-Square at a significance of ($P \leq 0.05$).

RESULTS AND DISCUSSION

The extent to which your school provides courses in green economy and sustainability

The respondents indicated the extent to which their respective Master's programmes provided that inculcated green economy and sustainability aspects. The following green economy topics were assessed: green economy, renewable energy, green financing, green innovation and technology development, sustainable use of natural resources, green design or architecture, environmental policy and management (Table 2). Results in Table 2 show assessment of relevant topics from postgraduate programmes across different schools. Green economy ($n = 61$, 26.9%, SD 1.175) was moderate, education for sustainable development ($n = 72$, 31.7%, SD 0.990) was slightly, green design and architecture ($n = 73$, 32.2%, SD 1.292) was moderate, green financing or investment

($n = 61$, 26.9%) was moderate, and promoting the creation of green jobs ($n = 70$, 30.8%, SD 1.275) was moderate. The result clearly indicates that sustainable use of natural resources ($n=108$, 47.6%, SD 1.184) is the key significant course that was dominant across all Master's courses. Thus, it indicated the extent to which they had interacted with green studies thematic areas in courses within their disciplines. These findings echo (Mikhno et al., 2021) that green economy studies have become critical globally and domiciling them in academia could transition interdisciplinary learning aspects and minds through curriculum development. The world is progressing, but not at the rate envisaged, as individual countries demonstrate leadership by enacting national green growth and economic strategies that promote academia. Several large-scale initiatives have enhanced development while remaining sustainable (Ali et al., 2021). We may look to the Republic of Korea, which has a national strategy and a five-year plan for green growth, Mexico City, which has successfully pushed bus rapid transit (BRT), and China's renewable energy program as models. Namibia, in Africa, has successfully managed its natural resources to support the economy, society, and climate, exemplifying the word sustainability (D'amato and Korhonen, 2021). This is driven with green economy and competent learning paradigm. For instance, unemployment among Kenya's youths has reached crisis proportions. According to Kenya's National Bureau of Statistics, 39% of the country's 13.7 million youths are jobless (Shah et al., 2021; Alushula, 2020). This alarming unemployment trend can be addressed through interdisciplinary studies, green skills inculcation and

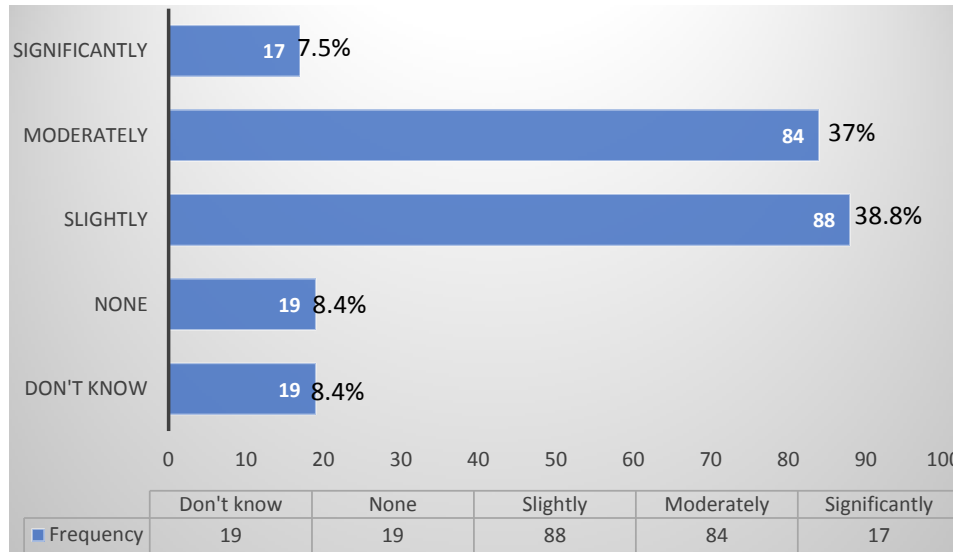


Figure 1. Green economy action learning and sustainability issues.
Source: Authors

Table 3. Preferred green economy and sustainability teaching and learning method.

Appropriate teaching and learning method	N	%
Action-oriented teaching and learning method	152	67
Holistic teaching and learning method	68	30
Learning through all senses	7	3.1
Total	227	100

Source: Authors

competence-based curriculum.

Action-oriented green economy learning method

Green economy learning and its applications in ten schools at Kenyatta University are shown in Figure 1. The learners were assessed to ascertain the extent to which application of action-oriented teaching and learning methods and programs can address green economy and sustainability. The results indicate that, on a scale of five, slightly (38.8%), significantly (7.5%), none (8.4%), moderately (37%) and do not know (8.4%) respectively. From the findings, the respondents indicated that the existing programs slightly or moderately addressed green issues at 38.8 and 37% respectively. Even with this response tally, some responses did not know nor felt if action learning method was inculcated in the programs. It is therefore imperative to ascertain the route for such a response within the existing university curricula. Upscaling green economy skills is integral towards attainment of holistic interdisciplinary learning in academia (O'Neill and Gibbs, 2014). In addition, Table 3 shows

three probable appropriate teaching and learning methods for green studies at Kenyatta University. Of all the respondents (n = 227, 100%), majority of the respondents preferred an action-oriented teaching method (n = 152, 67%). The other teaching and learning methods recorded were holistic teaching and learning methods (n = 68, 30%) and learning through all senses (n = 7, 3.1%) (Table 3). This therefore shows green economy teaching to be embedded more in an action-oriented approach. However, from the findings, actionable green learning needs more upscaling, like the participatory action-oriented study of Green Care in Finland (Moriggi, 2021). More information on the significance of green care practices for processes of place-based sustainability transformations that can be emulated by Kenyan higher education institutions is provided in the study. As the world's population grows, many people are struggling to make ends meet, and the significant majorities are university graduates (Munro, 2011). While many blame the government for the lack of employment opportunities, companies appear to have a different perspective (Kamau and Wamuthenya, 2021). For them, the educational system has not provided

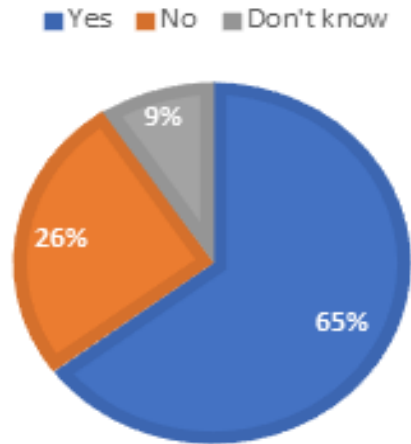


Figure 2. Green economy and sustainability aspects in coursework.
Source: Authors

enough relevance to the labor market. Graduates are seen to be lacking in the skills required to prosper and support local organizations, civil society, enterprises, and civic institutions. This issue includes a lack of planning, inventing, and problem-solving skills (Tilak and Choudhury, 2021). To reduce poverty and environmental damage, green materials use at our lecture halls and teaching graduates the green skills is critical for a transformative green economy.

Assessment of green economy and sustainability aspects in coursework

Figure 2 show an examination of green economy aspects in coursework. The Master's students (N = 227) indicated their responses accordingly. From the three choices of response, the majority of the students (n = 147, 64.7%) responded "Yes," the No responses were recorded (n = 59, 26%), and those who did not know were recorded (n = 21, 9.3%). The results therefore indicated the penetration of green economic and sustainability aspects during course examinations. A greener economic learning model is one that is well versed in different academic programs offered to learners (Breed and Mehrten, 2022; Lee et al., 2019). The findings agree with Newton et al. (2014) that it is widely assumed that new educational curricula are required to provide professionals with the necessary knowledge and abilities to successfully expand the green economy. At the moment, there are just a few institutions of higher learning that are devoted solely to the green economy, owing to its recent beginnings.

Postgraduate students' response on examination green economy aspects per school

The assessment of the green economy and sustainability

per school is shown in Table 4 respectively. The results show the School of Engineering and Technology leading all other schools with a response rate of n = 15, 93.8%), followed by the School of Environmental Studies (n = 36, 87.8%). The 3rd highest response was from the School of Agriculture and Enterprise Development (n = 20, 74.1%). Other schools had a response rate of above 50%, meaning an above average examination of green economy aspects in exams. However, only two schools had a leading negative (No) response; the school of economics (n = 15, 75%) and the school of pure and applied sciences (n = 12, 60%) (Table 4). Learners tend to respond differently to how they perceive interdisciplinary programs. Green economy learning is an emerging concept on which global higher institutions of learning base their focus (Sharma and Sharma, 2021).

To check on the significance of the association between school and the students' response to the question, "Are green economy and sustainability aspects assessed or examined in theory coursework?" Table 5 shows a significance index ($\chi^2 = 37.267$, df = 9, p = 0.000). Therefore, the students' responses were found to be significant.

Conclusion

Achieving sustainability will necessitate training processes at various levels as well as teaching programs in green economy and sustainability (Abd et al., 2019). Institutions need to include green economy learning in every degree and educational program taught. This will ensure learners work in productive sectors. Learners fail to connect theory with practice, and therefore, inclusion of green economy learning will help design students translate conceptual approaches into practice (Affolderbach, 2020). The green approach is taking a step ahead with the integration of green economy teaching in schools. The vital aspects of green economic studies are to impart positive knowledge and skills so as to impart positive and best practices from generation to generation. The aim of green economy teaching is to create a sustainable mindset in terms of social, environmental, and economic sustainability. Green economy teaching should be aimed at empowering learners with the ability and desire to work towards sustainable development.

Recommendations

Interdisciplinary programmes in the institutions of higher learning should be developed that domicile green economy aspects where, green skills and research are visualized. Institutions of higher learning should therefore strive to green learning, research, operations, and service in order to model and educate for sustainability to fulfill their mission and better prepare students for citizenship and green jobs. A number of green programs and

Table 4. Students response on examination green economy aspects per school.

School	Are green economy and sustainability aspects assessed or examined in theory coursework?			
	Yes		No	
	n	%	N	%
School of Agriculture and Enterprise Development	20	74.1	7	25.9
School of Business	12	60.0	8	40.0
School of Creative and Performing Arts, Film & Media Studies	14	70.0	6	30.0
School of Economics	5	25.0	15	75.0
School of Engineering and Technology	15	93.8	1	6.3
School of Environmental Studies	36	87.8	5	12.2
School of Hospitality Tourism and Leisure Studies	12	57.1	9	42.9
School of Humanities & Social Sciences	12	57.1	9	42.9
School of Public Health and Applied Human Sciences	13	61.9	8	38.1
School of Pure and Applied Sciences	8	40.0	12	60.0

Source: Authors

Table 5. Green economy aspects on coursework examination.

Pearson Chi-Square Tests		Are green economy and sustainability aspects examined in theory coursework	
	Chi-square	37.267	
School	df	9	
	Sig.	0.000*	

Significance: $p \leq 0.05$.

Source: Authors

initiatives are helping to shift higher education culture toward a goal of sustainability. A periodic review of curriculum provides new perspectives on the educational setting, the subject matter being taught, and the educational process. The new ideas from the review call for a much more integrated and comprehensive strategy for formal education to include green co-curricular activities on campus and in the community, and they must be implemented promptly. University programs should enhance regular reviews for curriculum and coursework in different disciplines to set precedence on emerging green economy studies and its relevance.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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