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Lund University Master of Science in
International Development and Management
August 2023

Towards a Green Workforce: Assessing Green Job Preparation in Panamanian and Costa Rican Universities

**Challenges, Gaps, and Opportunities for Sustainable
Transformation in Latin American Higher Education.**

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Abstract

The triple planetary crisis exerts high pressure on countries to transform their current economic system. The transition to a green economy is not only necessary to ensure sustainable development but also essential for countries to remain economically competitive. The neighbouring countries Panama and Costa Rica are both facing significant challenges under the green transition, despite their different growth and sustainability strategies. The lack of a properly trained workforce and underdeveloped green skills are significantly slowing down the green transition. To meet the growing demand for green high-skilled labour in Panama and Costa Rica, universities must incorporate green skills concepts in their institutional strategy.

By enhancing UNEPs Education for Green Jobs Framework with additional Latin American specific aspects, the author developed the *Education for Green Jobs in Latin America Framework*. Guided by the theoretical framework, this study explores the current preparation of university students in Panama and Costa Rica to enter the green jobs market. The qualitative multiple case study comparison shows the current offerings of three universities in Panama and three universities in Costa Rica and how they include green job preparation in their curricula and extra-curricular activities. Further, possible areas for improvement are identified through interviews with thematic experts, green jobs representatives and students. In total, 26 interviews, 10 focus group discussions and a thorough document analysis were conducted.

Findings suggest that universities in Panama and Costa Rica are willing to support the green transition and incorporate green job preparation concepts in their degrees. However, there are still significant gaps and a lack of coherence in their actions. A clear need for widespread and strategic transformations has been identified. Possible interventions are suggested in the areas of holistic sustainability strategy and approach, knowledge enhancement, skills and competency development and job opportunities. The findings herein support theoretical expectations and provide new perspectives on university students green jobs preparation.

Keywords: Panama, Costa Rica, Universities, Education for Green Jobs, Education for Sustainable Development, Green Transition, Green Skills, Triple Planetary Crises

Word Count: 14,993

Acknowledgments

I would like to express my deepest gratitude to all the amazing people who have contributed to the successful completion of this master thesis. Your support, encouragement, and assistance have been invaluable throughout this challenging journey.

First and foremost, I extend my sincere appreciation to all the research participants of my study. Your willingness to participate and share your insights were essential in shaping the outcome of this research. Your valuable contributions have made this study possible, and I am truly grateful for your cooperation.

I am deeply indebted to my ex-colleagues from UNEP, Tomas Declerq and Beatriz Martins Carneiro, for their support and tutoring during my time there. A special note of gratitude goes to Gloria Ordoñez, my friend, colleague, and mentor at UNEP. Your feedback, time investments and overall support made my thesis possible. I promise that I will repay you with some vegan cake.

I would like to extend my sincere appreciation to my thesis supervisor, Prince Young Aboagye. Your guidance, feedback, and expertise were invaluable in shaping the direction of this thesis. Your mentorship has been instrumental in my growth as a researcher and scholar.

To my dear friends in Panama, Germany, and Sweden, your trust in me and encouragement during the entire research process brought me over the finish line. I extend my heartfelt thanks to my friends Johannes, Daria and Gefi, as well as my brother Jonathan. Your incredible efforts and investment of time to review and provide feedback on my thesis were crucial in improving the quality of this work.

I am deeply grateful to my family and roommates for their constant support and understanding. Your constant encouragement and food supply ensured that I had the necessary energy to survive all the late-night study sessions.

Lastly, to my partner, Myra, I cannot thank you enough. Your unwavering love, empathy and support got me through this process and were the driving force behind my determination to complete this thesis. Your presence in my life has been a constant source of inspiration, and I am forever grateful for sharing these milestones with you.

To all those mentioned above and those who have supported me silently in the background, thank you for being a part of this journey. Your contributions have made this master thesis possible, and I am deeply humbled and appreciative of your kindness and support.

Glossary

Education for Sustainable Development: Education for Sustainable Development (ESD) is defined as a learning process (or approach to teaching) based on ideals and principles that prepare people from all walks of life to plan for, cope with, and find solutions for issues that threaten the sustainability of our planet and society (Leal Filho *et al.*, 2019; Unesco, 2020).

Green Economy: The United Nations Environment Programme (UNEP) defines a green economy as “one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.” (UNEP and UNESCO, 2016)

Green Jobs: The ILO defines green jobs as decent jobs that contribute to, preserve, or restore the environment, whether they are in traditional sectors such as manufacturing and construction, or in newer and quickly growing green sectors such as renewable energy and energy efficiency (ILO, 2018).

Green Skills: Cedefop defines green skills as the knowledge, abilities, values and attitudes needed to live in, develop and support a society which reduces the impact of human activity on the environment (Cedefop, 2019).

Nationally Determined Contributions: NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve (UNFCCC, no date).

Soft Skills: Soft skills are the abilities for dealing with jobs and persons such as communication skills, teamwork skills, problem-solving and critical thinking. Non-vocational, non-technical skills or competencies that are needed to perform at work and in society. They apply to work generally, rather than being specific to an occupation or industry. Among the great range of soft skills, the ability to work with others and in teams; the ability to solve problems and use technology; communication skills; and learning-to-learn skills are considered the most important to boost employment. Soft skills are also called generic skills, key competencies, key skills, portable skills, core skills and transferable skills (Strietska-Ilina *et al.*, 2012; Sern, Zaimé and Foong, 2018).

Sustainable Development: Sustainable Development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). It is important that there is not one “right” way to sustainable development and that the path taken by “developed countries” is not an example of how countries should develop.

Technical Skills: Technical skills are regarded as the skills that are related to occupation, such as programming, and repairing a car, and it is hands-on oriented (Sern, Zaim and Foong, 2018)

List of Abbreviations

ARIUSA: Alianza de Redes Iberoamericanas de Universidades por la Sustentabilidad y el Ambiente (Alliance of Ibero-American University Networks for Sustainability and the Environment)

CEDEFOP: European Centre for the Development of Vocational Training

ESD: Education for Sustainable Development

FGD: Focus Group Discussion

GHG: Greenhouse Gases

HEI: Higher Education Institution

ILO: International Labour Organization

LIC: Low-Income Country

MIC: Middle-Income Country

REDIES: Red Costarricense de Instituciones Educativas Sostenibles (Costa Rican Network of Sustainable Educational Institutions)

RUPADES: Red de Universidades Panameñas para el Desarrollo Sostenible (Network of Panamanian Universities for Sustainable Development)

UNEP: UN Environment Programme

UNESCO: United Nations Educational, Scientific and Cultural Organization

SDGs: Sustainable Development Goals

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1. Introduction

The planet and humanity are currently facing a triple planetary crisis: the rapid decline in biodiversity, high rates of pollution and climate change (UNEP, 2020). These interconnected issues are caused by unsustainable development practices that rely on fossil fuels and overexploitation of natural resources. The situation is becoming increasingly urgent and requires immediate action as the effects of the crisis are felt worldwide. All three crises, but especially the worsening climate situation, force humanity to rethink their way of living, producing and consuming. While there are many different approaches to tackle these issues, one of the most present solutions is the transition to a green economy. As the United Nations Environment Programme (UNEP) puts it: “

To reach the goal of creating an environmentally sustainable world, every job will eventually need to be green or at least greener” (UNEP, 2021, p. 173).

Transitioning to a Green Economy is not only necessary to protect our planet but it also holds immense economic potential. According to estimations by the ILO (2018), a transition towards a green economy holds the potential to create 24 million new jobs globally by 2030, driven by the adoption of more sustainable and efficient production practices, the rapid growth of renewable energies in the energy matrix, growth in electric vehicles as well as more sustainable building practices (Ibid.).

One significant obstacle to the greening of the global economy is the potential for skill mismatches. The recent 2023 World Employment Social Outlook report by the ILO (2023) shows that urgent changes in skill policies are needed to support the transition to a green economy. New and changing green jobs require different skills and tend to emerge at higher skill levels. These new occupations require both different technical skills as well as well-developed soft skills (Ibid.). To remove potential restraints from the green transition, it is important to integrate the new requirements of a changing economy into educational systems, especially into higher education systems. Education can be described as the *engine room* and backbone of an economy and is therefore crucial for its development (Malik, 2018). Universities and other higher education institutions must not only respond to new requirements by recent developments, but they must also provide leadership and enable the much needed greening of the economy (Raimi, Gift and Oluwakemi, 2019).

Latin America is a region that is particularly vulnerable to the effects of climate change. 13 of the 50 countries identified as most affected by the climate emergency are in Latin America (OECD, 2022). Thus, it is crucial for the region to promote sustainable development and reduce greenhouse gas emissions to reduce the gravity of the climate crisis. The region holds great potential for a sustainable transformation, for example in the promotion of renewable energies,

natural carbon sinks and sustainable agriculture (Sánchez and Torres, 2020). Recent estimations by the ILO and International Development Bank show that decarbonizing the economies in Latin America can result in a net creation of 15 million jobs (Saget, Vogt-Schilb and Luu, 2020). Especially the renewable energy sector holds huge potential for new employment. IRENA (2020) estimates that in this sector 3.2 million new jobs will be created in Latin America by 2050. Strong employment growth is predicted in areas such as renewable energies, electric transportation or eco-tourism, whilst employment decreases are expected in areas such as fossil-fuels, traditional agriculture or fishery (Altenburg and Assmann, 2017). Further, a green transformation does not only concern employees but also holds huge potential for promotion of self-employment and green entrepreneurship (Ibid.). Thus, the costs of not supporting a green transition can be higher than the costs of the transition itself.

Panama and Costa Rica are two Latin American countries that are not only geographical neighbours but that also share similarities in their strong economic growth rates in the last decades (Worldbank, 2022). However, there are also significant differences between both countries, especially regarding their approach to climate change and transitioning to a Green Economy. Through different national initiatives Costa Rica positioned itself as a leading example in Latin America of the transition to a green future (ILO, 2019). In contrast, by positioning itself as a regional logistics hub and strong service economy with outstanding economic growth, Panama has not managed to play a similar role when it comes to environmental sustainability (Beaton and Hadzi-Vaskov, 2017). While the two countries are currently pursuing different development strategies, building a future-oriented workforce will be a major task for both. It remains unclear whether both countries are prepared for a green transition, especially when it comes to preparing their workforce for new or changing green jobs.

While the green job preparation of other Latin American countries has already been analysed and deemed to be insufficient (McPherson *et al.*, 2016; Blanco-Portela *et al.*, 2018; ILO, 2019), the question whether the Panamanian and Costa Rican education systems are on track remains to be answered. Current research has only identified that educational staff lacks involvement in environmental topics and that universities miss the multidisciplinary perspectives needed for green jobs preparation (McPherson *et al.*, 2016). Further, research has shown that there is a need for better coordination between universities and the private sector about equating the demand for and supply of (green) labour (ILO, 2019). The two countries represent particularly interesting case studies due to their geographical proximity but significantly different approaches in addressing climate change and the challenges induced by it. As research on the topic is scarce in both countries, it is difficult to assess the current situation.

Previous studies have shown that a qualitative research design is most suitable to understand the complexity of green job preparation in Latin American universities (Boulanger *et al.*, 2012; Blanco-Portela *et al.*, 2018). Considering previous research approaches and the complexity and multifacetedness of education for green jobs, the author decided that a qualitative case study approach is most suitable for the research aim.

1.1 Research Questions and Purpose

With this study, the author intends to fill the research gap on education for green skills in Panama and Costa Rica. This study analyses green job preparation practices for students in universities in Costa Rica and Panama. Based on the analysis, potential areas of improvement for these universities are identified. The suggested improvements can help to counteract potential skill gaps for a green transition. The researcher intends to contribute to the global discourse on education for green skills, showcasing the perspective from two Latin American countries. Thus, following research questions, guiding this study are posed:

1.2 Research Questions

In line with the aim of this study, the following research questions are explored:

1. Assessed against the *Education for Green Jobs in Latin America Framework*, how do universities in Panama and Costa Rica prepare their students to enter the green job market?
2. What are potential areas for improvement in preparing students for the green job market in Panama and Costa Rica, according to relevant stakeholders?

1.3 Structure

Firstly, this study proceeds by presenting information on the economy and job market in Panama and Costa Rica, as well as a comparison of their sustainability strategies and higher education systems. Secondly, it reviews existing research on the preparation of students for green jobs. Thirdly, the paper outlines the theoretical perspectives that guide the study. Fourthly, the methodology used in the study, including the data collection and analysis methods, as well as limitations is discussed. Fifthly, the results of the qualitative data analysis are presented and discussed, including an exploration of the key themes that emerged from the data. Finally, the paper concludes with a summary of the findings, their implications, and potential areas for future research. Overall, this paper aims to contribute to the wider regional and global discourse on education for a green economy transformation.

2. Definition of Concepts

The concept of a *green economy* has undergone significant development over time, with various definitions proposed by scholars and experts in the field. Early definitions emphasize the integration of environmental and economic objectives, while later definitions, often regarded as strong sustainability concepts, broadened the scope to include social aspects as well (Loiseau *et al.*, 2016). There are several influential definitions that have shaped the understanding of a green economy over time (Table 1). While the first definitions, i.a. provided by Costanza *et al.* in 1997 emphasize the interconnectedness of the economy and the environment, they mostly disregard social aspects. Later definitions, for example provided by UNEP (2011), broaden the perspective of a green economy by incorporating social dimensions and the aim for sustainable development alongside environmental protection. A green economy embodies the Sustainable Development Goals (SDGs) by, amongst others, advancing climate action (SDG13), protecting life on land and below water (SDG 15 and SDG 11), providing affordable and clean energy (SDG 7) and promoting decent work and economic growth (SDG 8) (UN, 2015). Table 1 shows how definitions of green economy developed over time to include the aspect of social inclusiveness.

Table 1: Green Economy Definitions Over Time

Author	Definition
Costanza <i>et al.</i> (1997)	Ecological economics is the study of the economy as a subsystem of the ecosystem.
World Bank (2004)	The green economy denotes an economic model that emphasizes the development and adoption of environmentally friendly technologies, practices, and policies, fostering sustainable growth.
UNEP (2011)	A green economy is one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.
UNFCCC (2012)	A green economy is a low-carbon, resource-efficient, and socially inclusive economy.
European Commission (2014)	A green economy is characterized by sustainable and inclusive economic growth, based on low-carbon, resource-efficient, and socially responsible production and consumption patterns.

Note: Definitions are direct quotes from the author/organizations.

The concept of *green growth* is widely contested and still results in heated debates between academic and policy makers. The inclusion of decent economic growth (SDG 8) into the SDGs

suggests that achieving all other 16 SDGs is possible while maintaining economic growth. Organizations such as OECD or the World Bank believe that green growth is possible by using natural resources more efficiently which minimizes environmental damages (Table 2). However, until now, there is no example of economic growth that is respectful of the existing planetary boundaries (Loiseau *et al.*, 2016). On the one hand, UNEP (2011b) has provided examples for relative resource decoupling from economic growth. On the other hand, until now, research is unable to provide evidence for successful simultaneous resource reduction and economic growth. Consequently, numerous researchers advocate for an economic rethinking that disregards economic growth as a relevant indicator or goal (Alier, 2009; Kallis, 2011; Van den Bergh, 2011). Therefore, the author follows the green economy definition by UNEP (2011), which does not mention growth as an essential part of a green economy.

Table 2: Green Growth Definitions

Author	Definition
UNEP (2011b)	Green growth decouples economic growth and human well-being from environmental impacts and resource use.
OECD (2011)	Green growth is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and the environmental services on which our well-being relies. To achieve this, it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities.
World Bank (2012)	Green growth is qualitative growth that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental damages and resilient in that it explains natural hazards.

Note: Definitions are direct quotes from the author/organizations.

As an essential part of a green economy, *green jobs* are highly important for a sustainable future. Over time, the definition of green jobs has evolved, reflecting the growing recognition of the need to address environmental challenges as well as to promote a green transition and sustainable development. Initially, the concept of green jobs emerged in the 2000s, defining them as any decent job that contributes to maintaining and restoring the quality of the environment (Renner, Sweeney and Kubit, 2008). Similar to the development of the green economy definitions, subsequent definitions of green jobs incorporate broader aspects such as social equity and economic sustainability. In recent years, more comprehensive understandings of green jobs include both, sectors directly related to environmental preservation but also those that contribute to the transition to a greener economy (e.g.

Hofmann and Strietska-Ilina, 2014; ILO, 2019; LinkedIn Economic Graph, 2022). In this thesis, the author follows the definition provided by the ILO:

“Green jobs are decent jobs that contribute to, preserve, or restore the environment, whether they are in traditional sectors such as manufacturing and construction, or in newer and quickly growing green sectors such as renewable energy and energy efficiency” (ILO, 2018, p.187).

The development of the definition of green jobs has also led to the emergence of the concept of *"green skills,"* which refers to the knowledge, abilities, values and attitudes needed to live in, develop and support a society which reduces the impact of human activity on the environment (Cedefop, 2019). Green skills are essential for individuals to effectively contribute to and benefit from the transition to a green economy. While there is no single universally accepted definition of green skills, they are generally understood as the skills required for work in sectors that contribute to environmental sustainability and the greening of industries (Sern, Zaim and Foong, 2018). Green skills encompass a wide range of competencies, including technical skills related to inter alia renewable energy, energy efficiency, waste management or sustainable agriculture, as well as soft skills like project management, critical thinking, innovation, and entrepreneurship (Thomas and Day, 2014; Cedefop and OECD, 2015; Donald, Ashleigh and Baruch, 2018). The development of the green skills definition is closely linked to the evolving definition of green jobs, as they are interdependent and mutually reinforcing in driving the transition to a greener economy.

3. The Green Transition in Panama and Costa Rica

The next section describes similarities and differences in the current economic situation, sustainability strategies and higher education system in Costa Rica and Panama.

3.1 The Economy in Panama and Costa Rica

Panama has had the highest economic growth rates in Latin America in the past two decades (Worldbank, 2022). Per capita income has doubled since 2004 and converged to income rates that are mostly found in high-income countries (Beaton and Hadzi-Vaskov, 2017). Even though the economic growth resulted in significant socio-economic progress and improved well-being, Panama remains a very unequal country with significant high poverty rates among low-skilled, indigenous and rural workers (OECD, 2018). Its growth can be characterised by a dual economy, in which a small number of activities, inter alia the Panama Canal and the financial service industry, resulted in significant GDP growth but only limited job creation (Ibid.). Panama is a service dominated economy with more than two thirds of the GDP coming from the service sector, and around 20 percent from the industry (Worldbank, 2023b). Important economic sectors are the trade and logistics sector, financial sector, construction sector, manufacturing sector as well as the mining and agricultural sector (Ibid.). An often underrecognized sector is the tourism sector that contributes to 17 percent of GDP and 12 percent of total employment (Beaton and Hadzi-Vaskov, 2017). The government's focus has been to promote economic growth to reduce unemployment and poverty rates and ensure prosperity. While green growth does not play an important role in Panama so far, UNEP estimations (2020) show that investments in a green transition and renewable energies can boost Panama's economy significantly.

Costa Rica's economy is a mixed economy that heavily relies on exports of goods and services, particularly in the sectors of electronics, agriculture, and tourism. In the last two decades, Costa Rica experienced stable economic growth rates between 2.5 and 4.5 percent (Worldbank, 2022). Similar to Panama, the economy has shifted from an agricultural economy towards a service based economy (Boulanger *et al.*, 2012). Nowadays, the service sector contributes more than two thirds of the GDP and the industry sector around 20 percent (Worldbank, 2023a). At the industry level, there are several sectors that are growing faster than ten per cent annually, namely the energy sector, financial services, mining and other services (ILO, 2019). In contrast to Panama, Costa Rica is aiming to become a global role model in the green transition (ITCR, 2013). The country adopted this vision of becoming the "Green Hub" of Latin America, where their decarbonisation and green transformation is a strategy to strengthen their national competitiveness (ILO, 2018). Exemplary for this stands the massive expansion of their ecotourism industry in the last two decades.

In conclusion, Panama and Costa Rica both have comparatively strong and service-based economies. However, while Panama has focused primarily on ensuring economic development through economic growth, Costa Rica has positioned itself as a sustainability leader through the promotion of “green growth”.

3.2 Sustainability Strategies in Panama and Costa Rica

Panama is one of the few countries that is officially carbon negative which is mainly due to its vast forest areas and land protection efforts (Worldbank, 2023b). Nonetheless, its CO₂ emissions per capita of 2.99 tonnes in 2021 are above the average of most countries in the region (Ritchie, Roser and Rosado, 2022). The sectors that emit most Greenhouse Gas (GHG) emissions in the country are the energy sector, the agriculture, forestry and other land use sector (MIAMBIENTE, 2019). The transportation sector generates most of the GHG emissions of the energy sector and is the main consumer of petroleum derivatives and the increase of the vehicle fleet (Ibid.). Already now, Panama produces most of its electricity from renewable energies and commits to reduce its GHG emissions in the energy sector by 11.5% by 2030 and 24% by 2050 compared to a Business-as-Usual scenario (MIAMBIENTE, 2019; EU, 2020). Their NDCs to the Paris Agreement include emission mitigation ambitions of 30.4% by 2030 and 35.9% by 2050 (Gobierno de Panama, 2020).

Costa Rica with its vision of becoming a global sustainability leader has made significant progress in becoming more sustainable and carbon neutral, which was also recognized through international awards such as the United Nations' Champions of the Earth award in 2019 (UNFCCC, 2019). In 2021, Costa Rica achieved to produce 100% of their electricity through renewable energies which marked an important milestone towards their goal of being carbon neutral by 2050 (Ministerio de Ambiente y Energía, 2019; Worldbank, 2023a). In 2021, Costa Rica produced 1.52 tonnes CO₂ emissions per capita, which is significantly lower than the emissions per capita in Panama (Ritchie, Roser and Rosado, 2022). Their dedication to promoting green initiatives is based on the countries' vision to build a green economy that is emission free, resilient and just (Ibid.). Groves et al. (2020) estimate that the implementation of the National Decarbonisation Plan will bring \$41 billion in net benefits to the Costa Rican economy between 2020 and 2050. According to Costa Rica's National Climate Change Strategy, there are eight economic sectors prioritized as areas for intervention: agriculture, manufacturing, energy, solid waste, transport, water, tourism and land-use. Electrification efforts of private cars and investments in public transport are urgently needed since the transportation sector alone is responsible for one-third of the countries CO₂ emissions (ILO, 2019).

To summarize, Costa Rica and Panama are both countries in Central America that have made significant efforts towards sustainability in their pathways to carbon neutrality. While Costa Rica

has identified a green transition as a competitiveness factor and, therefore, implemented widespread sustainability measures, Panama is benefitting from natural carbon removal through widespread forest protection. However, Panama is facing high emissions in the transportation sector as well as a persistent fossil fuels dependence in the electricity production. Improving education for green jobs in universities will increase the populations support for the green transition and ensure that the labour force is equipped with the necessary green skills.

3.3 Higher Education in Panama and Costa Rica

The education system in Panama is organized into 5 sections, pre-school education, primary education, pre-primary education, secondary education (academic secondary and technical vocational secondary) and higher education (post-secondary, non-university and university). In recent years, Panama has invested significantly in expanding access to tertiary education. According to CONEAUPU (2023), as of 2023, there are 6 public universities and 36 private universities in the country. Undergraduate studies usually last 4 years, postgraduate studies, such as masters and doctors, vary in length depending on the course of study. Non-university higher education is provided by "Institutes of Higher Studies" or "Centres of Higher Education" which offer diplomas and professional technical training at the highest level (UNESCO, 2019b). Nowadays, Panama has more secondary and tertiary graduates as well as average years of schooling of its population than comparable countries (Beaton and Hadzi-Vaskov, 2017). However, Panama is still performing poorly in international and regional competency tests (Ibid.). The inadequately educated work force is a major obstacle for the sustainable development of the country (OECD, 2018). Further it faces the risk of slowing down a green transition by not being able to meet the skill requirements in emerging green jobs. To increase environmental awareness and prepare a green transition, in 2014, Panama passed a law making environmental education compulsory at all levels of education, including HEIs (Gobierno de Panama, 2014).

The education system in Costa Rica is widely regarded as one of the best ones in Latin America. In regional comparisons, the country is performing very well and ranked significantly above Panama (Beaton and Hadzi-Vaskov, 2017). The education system is divided into pre-school education, primary, secondary and higher education. In Costa Rica there are two types of university that work independently: public and private which sum up to 56 universities and 74 vocational schools (Strietska–Ilina, 2019). However, only five of the universities are public (CONARE, 2023). Para-university education offers intermediate qualifications and is provided in state-run and private educational establishments. Access to tertiary education has increased over the past years with more than 30% of young people accessing higher education (Ibid.).

While the higher education system in Costa Rica is highly regarded, there are still challenges that the country faces, particularly in terms of access and equity. The indigenous population of Costa Rica tend to be less educated and hold low-skill jobs (ILO, 2019). The issue of education is considered as a transversal axis in the National Climate Change Strategy, given its importance for the formation of environmentally responsible Costa Ricans (ITCR, 2013). Costa Rica's Organic Environmental Act Number 7554 demands that environmental topics should be included in all educational levels (Boulanger *et al.*, 2012). Several studies have shown that most universities require their students to take some courses in sustainability, with diverging results on whether private or public universities are more rigid in this regard (Garcia, 2010; Strietska-Ilina, 2019). In order to tackle potential skill deficits in a green economy, Costa Rica has promoted the inclusion of Education for Sustainable Development (ESD) in their educational systems as well as the expansion of green jobs and training programs among HEIs (Garcia, 2010; ILO, 2019).

In the education sector, clear differences can be seen between Panama and Costa Rica. While Costa Rica has a competitive advantage over Panama in the quality of education and the focus on sustainability, Panama has made progress in the areas of access to education and environmental education. Nonetheless, Costa Rica still has significantly higher economic returns on obtaining a university degree than Panama (Ferreyra *et al.*, 2017).

Table 3 shows a comprehensive overview over the economic, sustainability and higher education situation in Panama and Costa Rica.

Table 3: Green Transition in Panama and Costa Rica

	Panama	Costa Rica
Economy	<ul style="list-style-type: none"> • Service-based economy • Strong economic growth • Dual economy: Small number of activities (e.g. Panama canal) are responsible for big parts of the GDP but only for few jobs. 	<ul style="list-style-type: none"> • Service-based economy • Stable economic growth • Green growth strategy
Sustainability Strategy	<ul style="list-style-type: none"> • Carbon negative • High dependency on fossil fuels in energy sector • Comparatively higher emissions per capita than other countries in the region (2.99 tonnes) 	<ul style="list-style-type: none"> • 100% renewable electricity • 1.53 tonnes CO2 emissions per capita • Strong positioning as sustainability leader
Higher Education	<ul style="list-style-type: none"> • High share of secondary and tertiary graduates • Poor performance in educational tests • Significant expenditure increase in tertiary education in last years • Environmental education course mandatory for all 	<ul style="list-style-type: none"> • High quality system • Lack of access to tertiary education from marginalized groups • Inclusion of ESD in education systems on national level

4. Higher Education for Green Jobs: A Literature Review

This chapter introduces literature related to the role of universities in preparing their graduates for the (green) job market to situate this thesis within the existing research landscape and contextualize its findings.

Since literature on green job preparation by universities in Latin America remains scarce, this chapter firstly presents findings on preparation by universities for the general job market. Secondly, literature on green job skill trends is presented to distil the most relevant skills required. Thirdly, findings on necessary changes in general university curricula to facilitate the

acquisition of labour-market relevant (green) skills are presented. This chapter concludes with a synthesis of the research gap and a conclusion on how this research aims to contribute to it.

4.1 The Importance of University Education for the Labour Market

While the responsibility of universities in preparing their graduates for the labour market is still widely contested, it remains a reality that most students are in need of an adequate job after graduating. In their qualitative research study, Donald et al. (2018) analysed how students in the UK perceive their future career chances and how well the university has prepared them for the job market. Their findings show that students perceive their investment in higher education as beneficial for their employment opportunities but fear better prepared competitors. Employers seek graduates who possess relevant practical competencies as well as soft skills such as communication and problem solving skills (Oraison, Konjarski and Howe, 2019). Their analysis of current offers by Australian universities and the industry demands shows that there are also mismatches between university preparation and industry demands, especially in terms of cultural understanding and social attitudes. Similarly, Tomlinson (2008) elaborates that students perceive their academic qualifications as increasingly irrelevant for their employment opportunities, since they need additional qualifications that are currently not taught at university. While a university degree still brings significant employability gains, it becomes evident that universities must broaden their perception on teaching content and methodology. Further, it is important that higher education institutions include the actual skill requirements of their graduates into their educational approach.

4.2 Green Skills Market Trends

As highlighted above, the ongoing transition to a green economy has the potential for significant employment and productivity increases, especially in low and middle income countries (ILO, 2018, 2023). Recent data (Linkedin 2022) shows that the demand for workers with green skills (8%) exceeds the supply of green talent (6%). Therefore, identifying and teaching green skills must become a priority for HEIs. Through a systematic literature review, Sern et al. (2018) identified the ten main green skills demanded by the industry. These include soft skills such as design skills, leadership skills, management skills and communication skills, and technical skills such as energy skills, waste management skills, and financial skills. Similarly, in their analysis of 21 country reports, Strietska-Ilina *et al.* (2012) show that soft skills are as relevant as thematic knowledge for green jobs. In the *Skills for a Greener Future Report* (2019), the ILO goes one step further by differentiating green skills required in medium to high-skills occupations from those that are required across the entire labour force. According to the ILO, universities should focus on teaching both types of skills to prepare their students for high-skill green jobs. While environmental awareness, communication and negotiation skills, ability

to conduct risk assessments, adaptability and transferability skills, entrepreneurial skills and teamwork skills are important among all occupations, analytical thinking, coordination, management and business skills, innovation skills, marketing skills, consulting skills, networking skills, IT and language skills as well as strategic and leadership skills will mainly serve graduates to enter high skilled green jobs (Ibid.).

In the *Future of Work in Latin America and the Caribbean* report (Amaral *et al.*, 2019), the International Development Bank shows that the demand for advanced digital skills as well as teamwork, communication and critical thinking skills are increasingly demanded by employers in Latin America. Similar to others, they emphasise the need to transform educational systems to improve teaching of these cross-cutting skills. The educational programmes in Costa Rica that are focusing on environmental sustainability include a combination of technical skills as well as soft skills (Strietska-Illina *et al.*, 2012). The most common soft skills identified in the programmes were organisation and planning, understanding of sustainable development, leadership, entrepreneurialism, negotiation, use of new technologies, communication, evaluation skills and system thinking. These skills significantly overlap with green skills identified on a global level. To the author's knowledge, no similar research on Panama has been conducted. By comparing Costa Rica and Panama, this study contributes to filling this gap in the literature.

4.3 Universities and Green Skills

To teach these green skills, universities need to implement changes on different levels. By transforming their curricula's and teaching methods, they can give more importance to soft skills and sustainability knowledge (Strietska-Illina *et al.*, 2012). Further, they can match classroom and practical training through apprenticeships, internships, mentoring, case studies and field placements (Ibid). To ensure high quality sustainability education that includes new developments and recent technology from the rapidly changing environment sector, universities must equip teachers with up-to-date knowledge. Lastly, Strietska-Illina *et al.* (2012) highlight that universities must prepare their students for the labour market entry by providing entrepreneurship trainings as well as job matching offers. Hofmann and Strietska-Illina (2014) elaborate that shortages of qualified teachers are a major obstacle in green skill development, both in developing countries as well as in advanced economies.

In their research on greening initiatives among Chinese universities, Yuan *et al.* (2013) analyse different initiatives that incorporate different aspects of green universities, such as sustainable curricula, research and development for educating students and society on sustainable societal decision-making, and encouraging students' to engage in activities related to sustainability. They show that a high share of students and teachers still have relatively low

levels of environmental awareness. Thus, they conclude that more emphasis must be put on awareness raising activities. Further, they suggest the adaptation of sustainability-reporting practices to assess the success of different green initiatives by the university. In the country report for Germany, Strietska-Illina et al. (2012) showcase that courses on agrarian sciences now include a mandatory module on environmental and resource economics. They state that this improves environmental consciousness among all agrarian science students from early onwards. In Korean polytechnical HEIs, significant efforts were made to include sustainability aspects in the curricula (Lee, 2013). Curricula changes were made in collaboration with representatives from different green industries to account for their needs. In their analysis, the authors found that cross-institutional collaboration is essential for meeting the increasing demand for “green labour force” in the Korean job market. The government, industry and academic must work together to design comprehensive curricula that are in line with green job demands.

In the case of Turkey, Karakul (2016) describes how the current disconnect between the educational system and labour market causes a rise in the countries unemployment rates. However, the author shows that by including more green concepts in their teaching, universities can close the gap to new emerging graduate requirements from a green economy. Similar results were obtained by Betour El Zoghbi and Lambrechts (2019) who found that many students in South Africa felt a disconnect between their education and current real world problems, such as climate change. In their study, students highlight the need for a more holistic and systematic education that integrates sustainability in a transversal manner and encourages critical thinking. A lack of teacher training and awareness on environmental issues aggravates the structural issues described before. The participants in the study emphasise their interest in doing a meaningful job that is environmentally friendly. To do so, they feel the need for more practical experience through internships as well as problem-based learning concepts (Ibid.).

Compared to other regions, similar drivers and obstacles to green jobs preparation have been identified in Latin America (Blanco-Portela *et al.*, 2018). McPherson et al. (2016) identify the need for more multidisciplinary and interdisciplinary structures in HEIs in Latin America to successfully integrate sustainability as a transdisciplinary subject. They advocate that, to promote sustainable development, universities should incorporate real world case studies, experiential learning that encourages students to apply their knowledge to solve real life problems, problem-based learning, negotiations and work experiences through internships into their teaching methods. Additionally, they highlight that education for sustainable development requires a learning approach which focuses on communication, innovation and critical thinking (Ibid.). With regard to Latin America and more specifically Costa Rica and Panama, awaken

the interest for environmental sustainability must be one of the main goals and therefore play a predominant role in curricula changes (ITCR, 2013). In their qualitative study on the opinion of HEIs sustainability spokespersons from 10 different countries, Blanco-Portela et al. (2018) found that the lack of involvement of education staff in environmental matters hinders the further integration of sustainability aspects in education. They explain that environmental topics are often disregarded as distraction from the “real” knowledge. Nonetheless, most institutions acknowledge their responsibility as key agents of change (Ibid.).

In Costa Rica, universities have proactively identified the need for a transformed education for green jobs (Strietska-Illina *et al.*, 2012). Particularly public universities have been the most active in offering courses on environmental education (Garcia, 2010). Garcias’ research shows that overall, in Costa Rica, public universities are more advanced in terms of green jobs preparation of their students than private universities. A higher share of public universities requires undergraduates to take courses on environmental education, have sustainability related community projects and provide green career resources (Ibid). In comparison, no similar research has been conducted on Panama. Thus, it was impossible for the author of this study to conduct an in-depth literature-based review of the current state of education for green jobs in Panama.

Overall, previous research shows that students feel unprepared for the labour market and disconnected from the *real* world (Donald, Ashleigh and Baruch, 2018; Betour El Zoghbi and Lambrechts, 2019). Additionally, research in Latin America has shown that teachers and students lack environmental knowledge and awareness, despite universities stating that environmental sustainability is a priority for them (Garcia, 2010; Blanco-Portela *et al.*, 2018). Investigating the gap between the universities’ goals and the reality in implementation will help to understand where universities fail to address students needs and their priorities. While there is limited research on the success of current green job preparation practices in Costa Rica, both countries remain severely under researched in this regard. Analysing Panama and Costa Rica, countries with very different education and sustainability situations, will provide new insights on what challenges and opportunities these Latin America countries might have in common and where they differ. With this thesis, the researcher intends to contribute to close this gap. Obtained results can guide future research on the topic and help situating findings from other regional areas.

5. A Conceptual Framework: Education for Sustainable Development and Green Skills Education

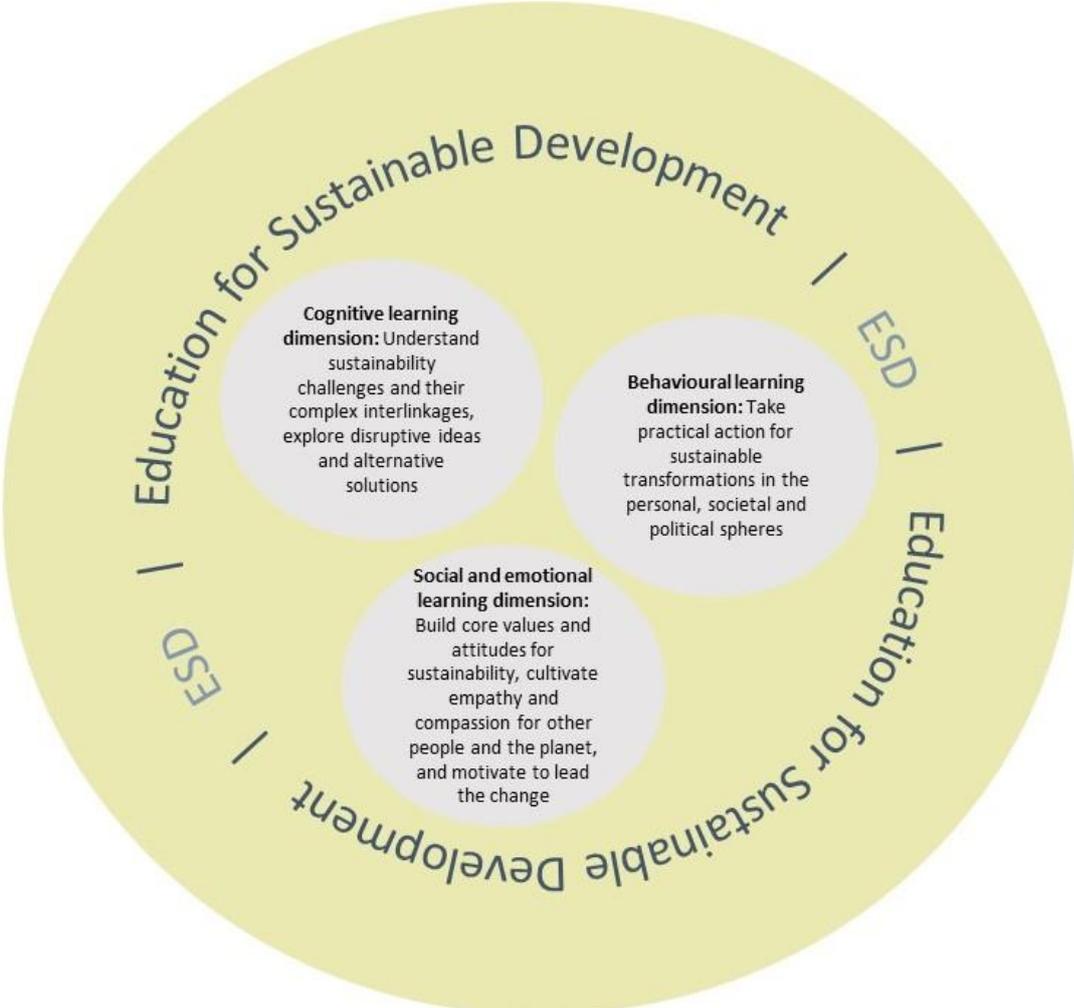
The conceptual framework of this study is based on three different theories: *Education for Sustainable Development*, *Green Skills for Green Jobs* and the *Greening Universities*

Framework. First, this chapter will present them briefly and show how they complement each other. Afterwards, an integrated version, where further *Education for Sustainable Development* as well as *Green Skills for Green Jobs* components are integrated into the *Greening Universities Framework*, will be presented. The newly designed *Education for Green Jobs in Latin America Framework* will structure the data analysis of this thesis. The selected theories have been carefully chosen and combined to facilitate a comprehensive examination of students' preparation for green jobs in Panamanian and Costa Rican universities, encompassing all relevant areas. By adhering to the *Education for Green Jobs in Latin America Framework*, the identification of potential shortcomings and opportunities for improvement can be assessed with greater ease.

5.1 Education for Sustainable Development

Current and predicted crises of the 21st century demand an overarching transformation of the current education system. Among others, urgent changes are needed in curriculum and assessment methods, teacher recruitment, training strategies and the integration of new technologies (Malik, 2018). Universities must reflect about their objectives and strategic goals and question whether they are playing the pivotal role in promoting sustainable development that society needs. As a way forward, UNESCO (2020) promotes the concept of Education for Sustainable Development (ESD) to empower learners with knowledge, skills, values and attitudes to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations. The concept can be defined as an approach to education that is based on ideals and principles that prepare the learners to cope with, and find solutions for issues that threaten the sustainability of our planet (Leal Filho *et al.*, 2019). The ESD framework emphasizes the need for individuals to develop knowledge, skills, and attitudes that enable them to contribute to sustainable development and the Agenda 2030 (Figure 1). Thus, it goes beyond topical issues but rather takes a holistic approach on learning content, outcomes and pedagogy (Unesco, 2020). According to Bell (2016), enhancing the student's vision of a more sustainable future as well giving them the capabilities to take actions is a critical element of ESD. Disterheft *et al.* (2013) show that ESD aims to both, enable learners to become independent critical thinkers that engage with current challenges as well as alter the learners' daily habits towards more sustainable practices, which are both capabilities that are highly relevant for individuals wanting to work in green jobs.

Figure 1: Education for Sustainable Development Framework



Source: Own depiction, based on Unesco (2020)

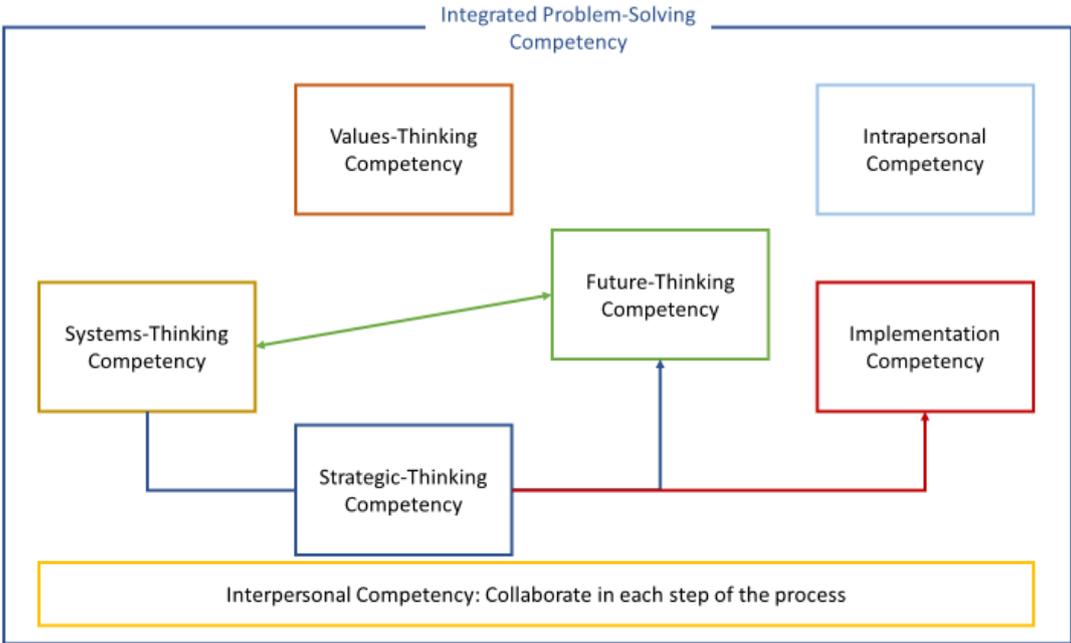
5.2 Green Skills for Green Jobs

Green skills refer to the knowledge, skills, and abilities required to work in a green job (Cedefop, 2019). These include technical skills such as renewable energy technologies, as well as soft skills such as communication, teamwork, and problem-solving. According to the ILO (2019), green skills are essential for promoting the transition to sustainable economies and societies. While green skills have a significant overlap with other technical or soft skills, they are called green skills when they are frequently required in green jobs. The list of potential green skills is long and is updated frequently, giving the new requirements of a constantly changing world (Cedefop and OECD, 2015). Murga-Menoyo (2014) emphasises the importance of general skills in sustainability such as a critical contextualisation of knowledge by looking at all dimensions of sustainability, knowledge about the sustainable use of resources within the planetary boundaries, application of ethical behaviour and lastly community involvement practices. Her strong focus on values highlights one important aspect of green skills. Meanwhile, Consoli et al. (2016) argue that the particularity of green jobs is mainly the

need for high-level abstract skills. These entail cognitive and interpersonal know-how that help to adapt to constantly changing tasks and situations. UNEP and UNESCO (2016) on the other hand highlight four general green skills that they consider important for any sustainable job: ecological literacy, systems thinking, design and technology understanding and finally the understanding of cultural contexts.

Brundiers et al. (2021) propose a *Key Competencies in Sustainability Framework* that entails eight different competencies (Integrated Problem-Solving Competency, Systems-Thinking Competency, Values-Thinking Competency, Strategic-Thinking Competency, Futures-Thinking Competency, Implementation Competency, Intrapersonal Competency and Interpersonal Competency), which can be seen as the general competencies needed in green jobs (Figure 2). Each of the competencies is a cluster of related competencies. These competencies can be seen as additional competencies, complementing traditional key and academic skills for example critical thinking, communication or data management (Ibid.). In a report published by Cedefop and the OECD (2015), a similar division into competencies has been proposed.

Figure 2: Key Competencies in Sustainability Framework

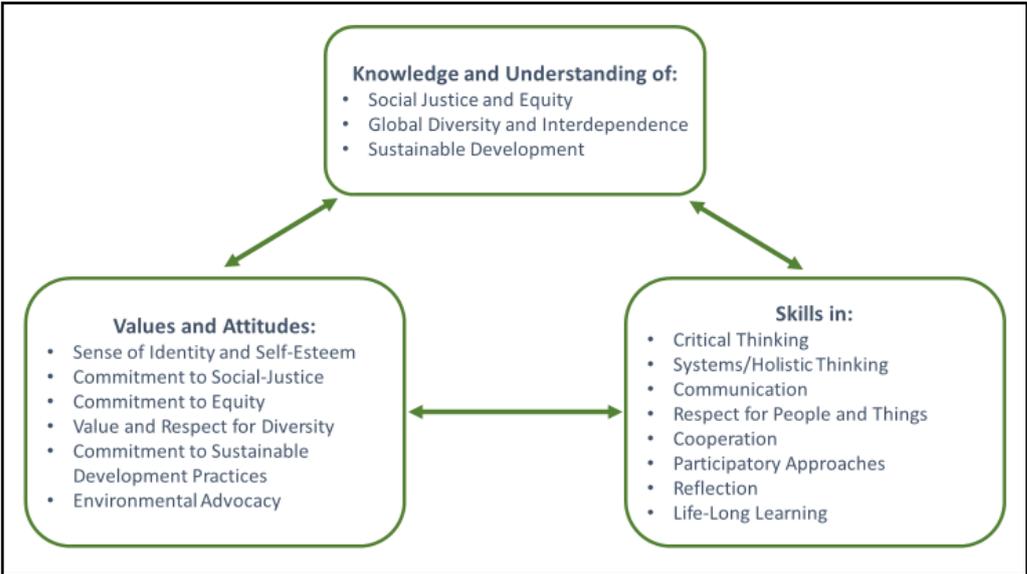


Source: Own depiction, based on Brundiers et al. (2021)

Further, they divide Green Skills into three different categories: technical and subject-specific competencies, generic interdisciplinary competencies and normative aspects of skills – visions, values and preferences (Ibid.). Thomas et al. (2013) also divide general graduate skills associated with sustainability into three categories (Figure 3). The core of the first category is a solid understanding and familiarity with sustainable development and associated concepts. In the second category, the authors combine values and attitudes such as respect for diversity, commitment to social justice or environmental advocacy together. Lastly, the third category

entails a set of skills that they have identified as necessary. Examples are critical thinking, systems thinking, communication, cooperation and reflection.

Figure 3: Graduate Capabilities Associated with Green Jobs



Source: Own depiction, based on Thomas et al. (2013)

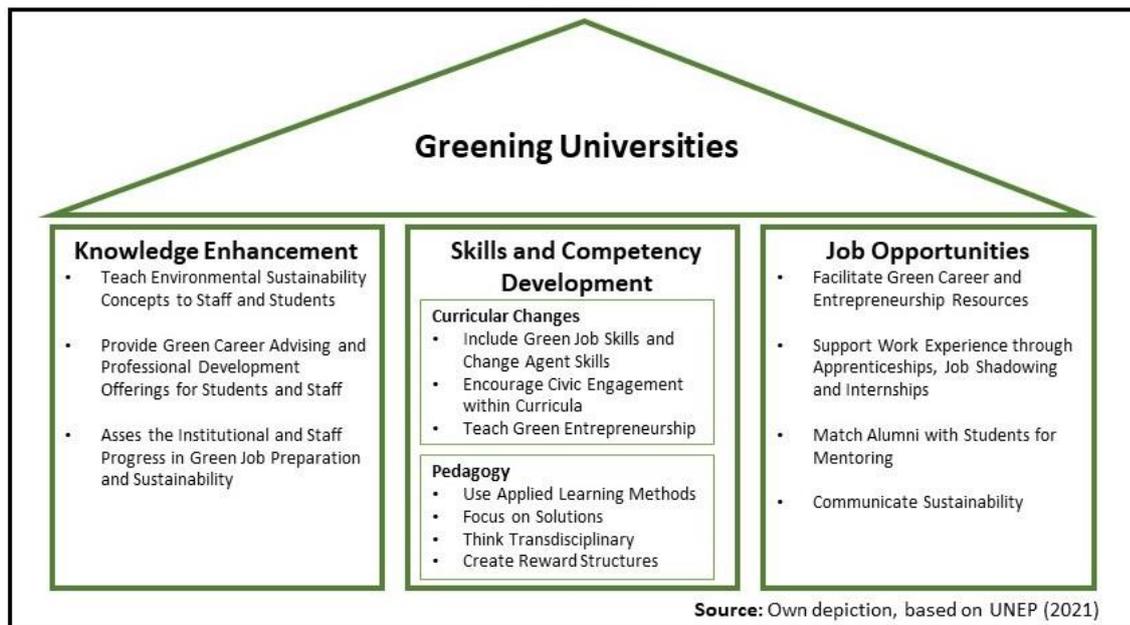
The green skills identified by the different authors significantly overlap with the objectives of ESD described above. Thus, implementing a comprehensive ESD strategy helps countries to equip their workforce with the green skills necessary for a successful transition towards a green economy. Universities and other educational institutions must assess the green skills needed and incorporate them in their strategy.

Hofmann and Strietska-Illina (2014) explain that, in general, there are two different approaches to including green skills in existing curricula, either by including a standard module across different degrees or by integrating new material on green skills in already existing courses. While countries with well-developed skill development systems in their education already incorporate environmental considerations as cross-cutting issues at all levels, these practices often lack in less progressive education systems (Ibid.).

5.3 Greening Universities: Steps to Transform Tertiary Education

As previous research has shown, many universities globally but also in Latin America, Costa Rica and Panama are interested in greening their institution (Blanco-Portela *et al.*, 2018). However, often there is a lack of vision on how to make this transition reality. In 2021, UNEP published the *Global Guidance for Education on Green Jobs Connecting Higher Education and Green Opportunities for Planetary Health* (2021). The document provides guidance to universities that aim to prepare their students better for green jobs by proposing tangible actions in three different areas: Knowledge Enhancement, Skills and Competency Development, and Job Opportunities (Figure 4).

Figure 4: Greening Universities Framework



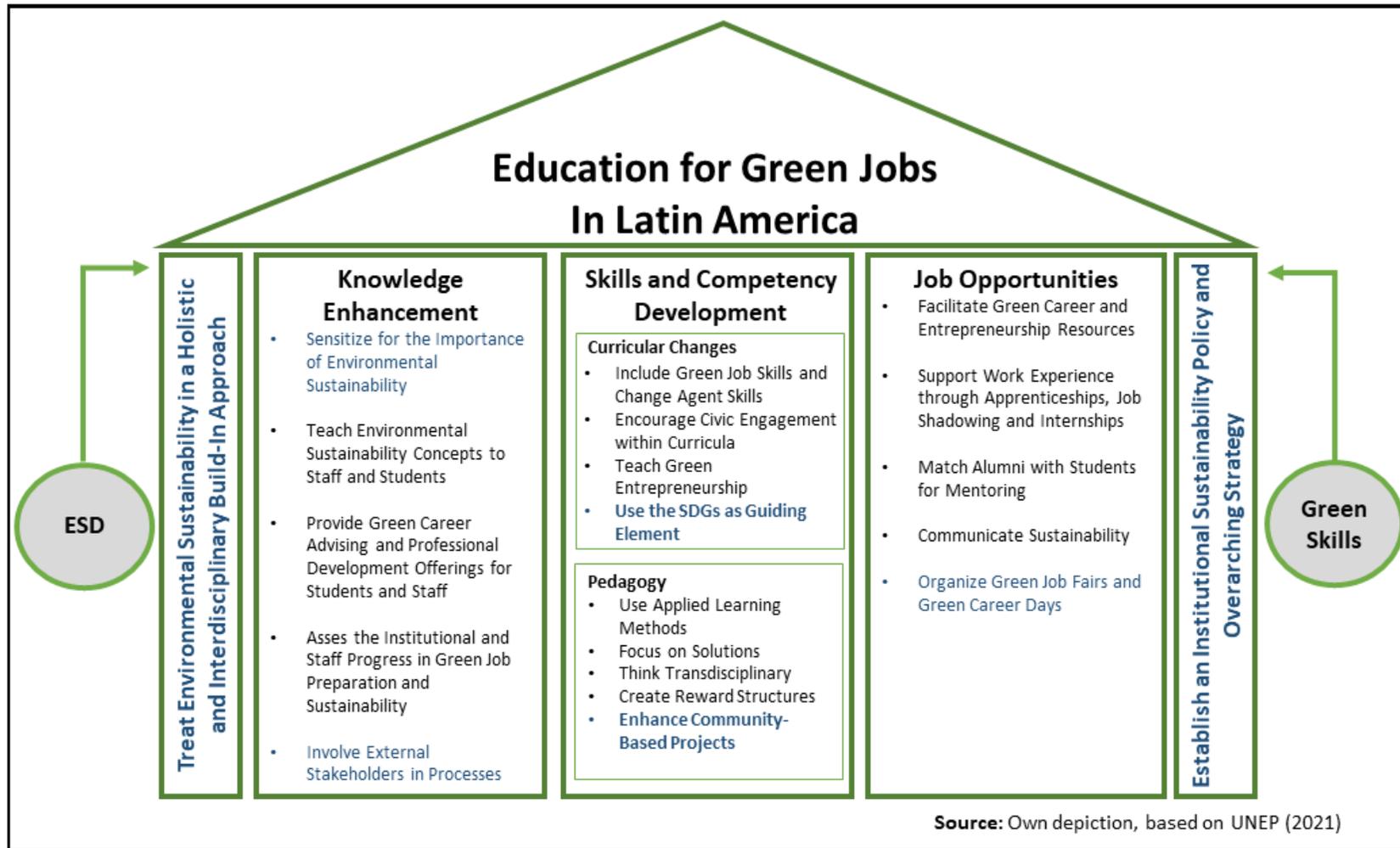
In the area of knowledge enhancement, the focus is on increasing environmental awareness among all stakeholders: students, university staff and the university as an institution. By providing sustainability information, green job trainings and other professional development opportunities in this area, universities can ensure that curricula changes towards more green concepts are actually implemented in class. Many authors have shown that increasing environmental awareness and knowledge of green topics and skills among teachers and other staff is crucial for a successful transformation of the education system (Hofmann and Strietska-Illina, 2014; Murga-Menoyo, 2014; Cedefop and OECD, 2015; Malik, 2018; Betour El Zoghbi and Lambrechts, 2019). The development of Green Skills among students can be enhanced by changes in curricula and pedagogy. There, the focus lies on applied learning practices that connect the student with the real world. Further, UNEP suggests to actively include green and entrepreneurship skills in the academic focus. Through action-based learning, civic engagement opportunities and reward structures, students are given the skills and motivation to become active agents of change. To capture the different dimensions of sustainability and green processes, transdisciplinary teaching must become standard practice. Lastly, universities should support their students during the transition into green jobs. By integrating job shadowing, internships or other practical components in their curricula, universities facilitate first working experiences. These can be guided towards green occupations through green career advising, green skills awareness raising activities, access to green career resources and platforms or green career events. Additionally, there are other possible activities that support students in finding green jobs, such as mentoring programmes or entrepreneurship hubs (Ibid.).

Some additional remarks can be found in key literature on the topic. Disterheft et al. (2013) comment that so called built-on approaches to sustainability will not solve the green skills problem among the entire workforce. Instead of developing specific courses and programs on sustainability that target only a specific self-selected group, they suggest a built-in approach that integrates sustainability in existing degrees and courses. Further, teaching should be aligned with the Sustainable Development Goals and include them as holistic guidance for the curriculum (Leal Filho *et al.*, 2019). UNESCO (2020) emphasises that the entire university as an institution needs to be aligned with sustainable development practices and incorporate them in their practices. Additionally, universities must engage with local communities to connect students with local issues and enable project-based learning (*Ibid.*). In general, the interaction with external stakeholders, such as the public sector or industry, is important to assess green skill needs and to identify occupations and areas with particularly high demand for green skills (UNESCO-UNEVOC, 2018). Similar to the global context, the first important step is to sensitise educators in both countries for environmental sustainability so that curricula changes are actually implemented in practice (Blanco-Portela *et al.*, 2018). Lastly, universities must prioritise the connection of students with green job opportunities through different activities. In the context of Latin America, some suggestions were the organisation of green job fairs, internship programs, community-based projects, real-world case studies, and action and experiential learning.

For this study, the author used the additional aspects provided by green skills and ESD literature as well as Latin American particularities to extend the *Greening Universities Framework* (UNEP, 2021) with additional components (Figure 5). The author created the *Education for Green Jobs Framework in Latin America*, by integrating insights from various theories, to conduct a contextually relevant evaluation of universities in the region. Additional components are the emphasis on a holistic, interdisciplinary build-in approach to increase competencies among all students and staff. Further, the necessity for a comprehensive institutional sustainability strategy is raised. Lastly, smaller components such as an encouragement of industry, public sector and community involvement, as well as a stronger focus on the SDGs, and the organisation of green job fairs are included. This new framework will guide the analysis of the research and is divided into five pillars:

1. Treat Environmental Sustainability in a Holistic and Interdisciplinary Build-In Approach
2. Knowledge Enhancement
3. Skills and Competency Development
4. Job Opportunities; and
5. Establish an Institutional Sustainability Policy and Overarching Strategy.

Figure 5: Education for Green Jobs in Latin America Framework



6. Methodology

6.1 Research Design

The study follows a qualitative research design, which enables individuals to share their stories and provides a better understanding of the various factors and the environment that impact human behaviour. Through interacting and empathising with the participants, the researcher is able to understand the various viewpoints and multifaceted phenomena such as organisational and change processes, as well as social interactions that influence outcomes, as noted by Patton (2014). To understand the needs and challenges of all the stakeholders involved well as their perceptions of the status quo, a qualitative approach was deemed suitable. In the following, the author will provide information on the case selection, data construction processes and the data analysis. Lastly, the author will reflect on limitations and ethical considerations of the study.

6.2 Case Selection

The thesis follows a comparative case study approach to compare the situation of graduate preparation for green jobs in three public and private universities in Panama with the situation in three public and private universities in Costa Rica. This comparative multiple case study design allows the researcher to provide a detailed analysis of each case (within-case analysis), followed by a thematic comparison between the cases (cross-case analysis) (Creswell and Poth, 2016). Previous research has also shown that there are differences between private and public universities in Costa Rica and their greening efforts (Boulanger *et al.*, 2012; ILO, 2019). No similar research has been conducted in Panama. Further, Costa Rica and Panama differ significantly in their sustainability efforts as well as their educational situation (Ferreya *et al.*, 2017; and Chapter 2). This design provides insights into similarities and differences within each country as well as similarities and differences between the two countries (Bryman, 2016).

As described in chapter two, university education in both countries is divided into private and public universities. In Panama, there are currently 6 public universities and 36 private universities, while in Costa Rica there are 5 public and 51 private universities (CONARE, 2023; CONEAUPU, 2023). However, it is important to note that in both countries public universities are bigger than private universities when it comes to student numbers (Ibid.). Thus, both public and private universities play an important role in the countries' tertiary education. Therefore, both private universities and public universities were considered. All universities are officially registered under the national education authority. Further, all of them participate in the *Alliance of Ibero-American Universities for Sustainability and the Environment (ARIUSA)* and their national counterparts REDIES (*Red Costarricense de Instituciones Educativas Sostenibles*)

and RUPADES (*Red de Universidades Panameñas para el Desarrollo Sostenible*). Thus, all participating universities have already shown some interest in sustainability and the environment. To ensure the anonymity of participants and participating universities, no further information on the characteristics of the universities will be presented.

6.3 Data Collection Methods

To answer the research question for the selected cases, the researcher gathered information through various information channels. The combination of several different information sources is a useful method to gather and contrast different perspectives (Creswell and Poth, 2016). Given the selected cases and formulated research questions, qualitative data construction methods were deemed most suitable. The author used a variety of qualitative methods such as semi-structured interviews, focus-group discussions, document analysis and a review of existing literature. The variety of data sources contribute to the quality of the case study analysis by providing multiple perspectives on the topic (Yin, 2003). Further they enable the researcher to triangulate and contextualize different information (Ibid.).

In Panama, most of the interviews and focus-group discussions were conducted in-person. In Costa Rica, the data collection was done virtually. Virtual data collection was possible due to the good digital infrastructure in universities and the private sector after the COVID-19 pandemic. Advantages of the virtual data collection are a reduced carbon footprint of the research study due to less travelling, lower hurdles for participation and economic reasons (Bryman, 2016). However, some of the challenges were the sometimes unstable internet connection as well as the loss of personal touch, especially in group settings.

6.3.1 Sampling

For this multiple case study comparison, universities were purposefully selected to show both private and public university perspectives on the topic and to exemplify the preparation of university students for green jobs in Costa Rican and Panamanian universities (Patton, 2014). For the participants selection, Bryman (2016) indicates that the goal of purposive sampling is to sample participants in a strategic way, so that their contributions are relevant to answer the research questions. Accordingly, the author of this study used purposive sampling technique, selecting participants mainly by “informational considerations” (Mikkelsen, 2005, p. 193). Participants for the study were identified accordingly to their “information-richness”. Preferred candidates were those with significant thematic knowledge, insights, or direct relevant experience (e.g. sustainability officer of the university). Further, they were selected in order to ensure that there is a variety in occupation and role in the sample, so that sample members differ from each other in their perspectives to the research question (Bryman, 2016). Similar

approaches in the thematic area were followed by Brudiers et al. (2021) or Donald et al. (2018). However, this non-probability sampling approach does not allow the author to generalize the findings to a population (Ibid.).

As starting point, the author contacted the Environmental Education Representative for Latin America and the Caribbean from UNEP and a regional representative from ARIUSA, to talk about the scope of the research. After identifying Panama and Costa Rica as potential candidates, both focal points helped the researcher to get in touch with the current chairperson of REDIES and RUPADES. In the case of Panama, further contact with the Council of Rectors was made. The country focal points formally contacted their network of universities and asked whether there is interest in participating in the research. In the end, two private and one public institution in each country were interested in participating in the study which resulted in a total of 6 universities being analysed. Afterwards, one focal point from each university was identified and communicated to the researcher.

To plan the next steps, the researcher met all focal points and identified potential candidates for the interviews and focus-group discussion. In these meetings, the sustainability officer, the director of curricula and various students with interest in sustainability topics were identified as potential interview partners. In line with the *Education For Green Jobs - Institutional Guide* (UNEP, 2021) these actors were identified as most knowledgeable in terms of the different improvement areas identified by the UNEP guide. Individual interviews with the directors of curriculum and sustainability officers were set up. The sustainability officers had most knowledge of the overarching sustainability strategy, different initiatives and cooperations taking place as well as other sustainability related activities in the university. Further, the directors of curricula were able to explain the different curricula processes, thoughts behind them and whether some of the aspects mentioned in the *Education For Green Jobs Framework* are included in the curricula.

Lastly, it is important to give room to the students to voice their views, the actual target group of the interventions. This is particularly important to identify potential gaps between institutional strategies and initiatives and what students see and receive. Moreover, students are not officially employed by the university and are therefore more likely to give an unbiased opinion. The author decided to conduct focus-group discussions with the students to create a space of critical discussion where the students can react to each other and reflect on their own positive and negative views on the university (Bryman, 2016). Lastly, the focal points of the universities facilitated access to relevant documents for the researcher.

To answer the second research question identifying potential areas of improvement for the universities, the author identified regional thematic experts, people working in green jobs in Costa Rica and Panama as well as students as relevant stakeholder groups. Once more, the

Environmental Education Representative for Latin America and the Caribbean from UNEP supported the researcher in identifying potential interviewees. In many cases, first contact was established with other UNEP officials. These officials then had relevant contacts from the private sector or other international agencies. This snowball sampling enabled the researcher to talk to engaged individuals from different sectors. In the end, interviews were conducted with four green job representatives per country, one from each of the following areas: Renewable Energy, Electric Mobility, Sustainability Consulting or Mining and Eco-Tourism. The areas were selected according to their relevance for a green economy transformation in the respective countries (ILO, 2018; OECD, 2022; Chapter 2). Identifying and organising a meeting with people working in different green economy areas in Panama and Costa Rica was not always easy. Due to unresponsiveness and spontaneous unavailability, different candidates were contacted via email. There, the author relied on snowball sampling. Potential candidates were identified by previous interviewees and other contacts made during the research process. Due to a strong network of people interested in sustainability topics in both countries, snowball sampling was a useful and efficient strategy to identify other participants with relevant experience and knowledge (Patton, 2014). Additional to these eight interviews, four regional thematic experts from ARIUSA, ILO, UNICEF and ILO were interviewed. The student focus-group discussions were conducted with the same students identified for the first research question.

A list of participants of the interviews and focus-group discussions is included in Appendix 2. To safeguard the anonymity of participants and participating institutions, they are anonymised.

6.3.2 Interviews

Semi-structured interviews were conducted with 8 people working in green jobs, 14 people working in universities and 4 regional experts. The author deemed semi-structured interviews most suitable since they allow the researcher some flexibility to follow-up on aspects mentioned and case particularities while still ensuring some structure to facilitate an easy comparison between cases (Bryman, 2016). Based on previous research and the theoretical framework, an interview guide was developed (Appendix 3). However, most questions were broad and open-ended to open the space for the participants and give them the opportunity to put emphasis on specific points (Creswell, 2014). Especially in the context of the universities, not all respondents were able to answer all questions. However, by aggregating the answers from all people interviewed, the author was able to gather extensive information on all topics.

In total 13 women and 13 men were interviewed. 24 of the 26 interviews were conducted in Spanish, due to individual preferences by the interviewees, 2 interviews were conducted in

English. With the written or oral consent of the participants, each of the sessions was recorded digitally. Further, field notes were taken to serve as back up to the audio recordings.

6.3.3 Focus-Group Discussions

Further focus group discussions were conducted, six in Panama and four in Costa Rica. This disparity is due to slow response rates and limited resources of the researcher. The aim of the researcher was to have three to five people per focus group to ensure an active discussion where everyone could make their points (Bryman, 2016). However, due to the researcher's dependency on the universities' focal points and spontaneous changes in plans, the size of the groups had to be adapted spontaneously and varied from two to seven people. Participants were encouraged to speak up as well as contrast each other. By listening to others – in contrast to interviews - participants might want to modify their view, voice agreement or disagreement and challenge previous statements which gave the researcher additional information (Ibid). As already done by other researchers (Betour El Zoghbi and Lambrechts, 2019), the author aimed to encourage the students to critically question their experiences at the university and see whether they oppose to points mentioned by other students. Similar to the interviews, the questions were designed broadly to allow participants to highlight specific points. To create a relaxing and open atmosphere, fresh fruits were provided to the participants. In some cases, the researcher noticed that participants felt uncomfortable at the beginning and opened up slowly through encouragement and time passing. In all cases, participants were made aware that they do not have to answer every question and can decline participation at every moment.

6.3.4 Document Analysis

Additional to focus groups and Interviews, the author collected material on different degrees offered by the universities. As explained by Bryman (2016), document analysis can give important additional information to the researcher. In discussions with the university focal points, one degree per faculty was identified. The aim of the author was to assess the curricula design of one degree per faculty of each of the universities. The focal points were asked to propose one degree per faculty that they would identify as most representative or “typical” for the faculty. However, the author noticed that in some cases, the degrees identified were not “typical” but rather regarded as more progressive in terms of environmental sustainability and therefore suggested to the author. Thus, results need to be considered carefully due to a possible selection bias. In most cases, the focal points then shared the “study plan” for each degree with the researcher. The study plan entails a general description of the objective and main pillars of the degree as well as a list of all modules. Sometimes, a description of the modules that entailed environmental concepts was added. In a few cases, the researcher was referred to the university's web site where the study plans were made available publicly. In

total, 22 university degrees were analysed. The number of degrees analysed per university depended on the number of faculties of the university. In most cases, bachelor's degrees were analysed. In two cases, due to particularities of the universities, master's degrees were analysed too. An overview over the universities and faculties is included in the appendix (Appendix 1). The author is unable to go into detail of those particularities to ensure the anonymity of the universities.

6.4 Data Analysis

For the interviews and focus group discussions, qualitative analysis was done using Nvivo 12. In the process, a codebook was created. The codebook is based on the interview guide, previous research and the theoretical framework and was later further deduced from the interviews, focus group discussions and document analysis (Kiger and Varpio, 2020). The different data sources were triangulated to ensure that established themes were based on converging perspectives from participants and other data sources. Thereby, a certain degree of flexibility and adaption remains, reducing the risk of biases and enabling the researcher to fully explore the collected data in a broad and extensive way (Kiger and Varpio, 2020). All documents were examined in Word, and results tabulated in Excel. The data is presented predominantly through the utilization of participant's quotations, encompassing a range of passage lengths from lengthy to short embedded passages (Creswell and Poth, 2016). Further, some numeric comparisons as well as comparisons in matrix form are included.

6.5 Limitations and Ethical Considerations

Qualitative analysis is a crucial aspect of research that involves exploring phenomena in-depth to gain an understanding of their complexities. It provides rich and detailed data, but it is not without limitations. Purposive and snowball sampling techniques are commonly used in qualitative research, but they also have limitations that can impact the validity of the study. Purposive sampling, as a non-probability sampling technique, may lead to a biased sample that can affect the validity of the study (Creswell, 2014). Similarly, snowball sampling, as a recruitment strategy, also has some limitations. Biases can be introduced in the sample selection process when participants refer others who share similar characteristics, values, and beliefs (Parker, Scott and Geddes, 2019). To avoid such bias, the cases and participants were sampled based on criteria informed by previous research and gatekeepers. For internal validity, triangulating the different data sources helps to establish congruence and possibly gives explanations for diverging results (Creswell and Poth, 2016). Given the design of the study, external validity is limited. Therefore, no generalising statements can be made. The geographic focus on Costa Rica and Panama and the country's particularities do not allow statements for entire Latin America.

Before, during, and after the research, the researcher reflected on his own positionality. As a white German man that has only lived in Panama for a limited time and never in Costa Rica, personal characteristics and biases may have affected the results (Scheyvens, 2014). Power imbalances between researchers and participants can arise, which can affect the quality of the data collected (Palmer *et al.*, 2014). For instance, participants may be hesitant to express their opinions freely since they heard that UNEP, ARIUSA or other well-known organisations facilitated the contact to the participants. As a prevention method, the researcher emphasised his independence as an academic researcher and student to establish a more equal relationship.

The researcher is aware of the intersectionality between different social categories, such as skin colour, education, ability, wealth, language, gender, nationality and mental health (Ibid.). For example, women are more likely to experience discrimination and harassment in the job market, especially if they are poor (Faria, 2021). Therefore, the author carefully examined and questioned the obtained results for underlying power dynamics or outcomes shaped by intersectionality. To remove accessibility barriers, interviews were conducted in Spanish, the language that is the main language in both countries and predominantly used in the educational systems. Full informed consent was obtained before the data collection and all data was anonymized. Additionally, the final study and results will be shared with all participants. An executive summary in Spanish will be made available too.

7. Results and Discussion

This chapter presents and discusses the results of the study. It is divided into two sections, one for each research question. In the first section, the current green jobs preparation of students in six different universities in Panama and Costa Rica will be assessed, while in the second section areas for improvement are identified. The above-presented theoretical framework guides the assessment.

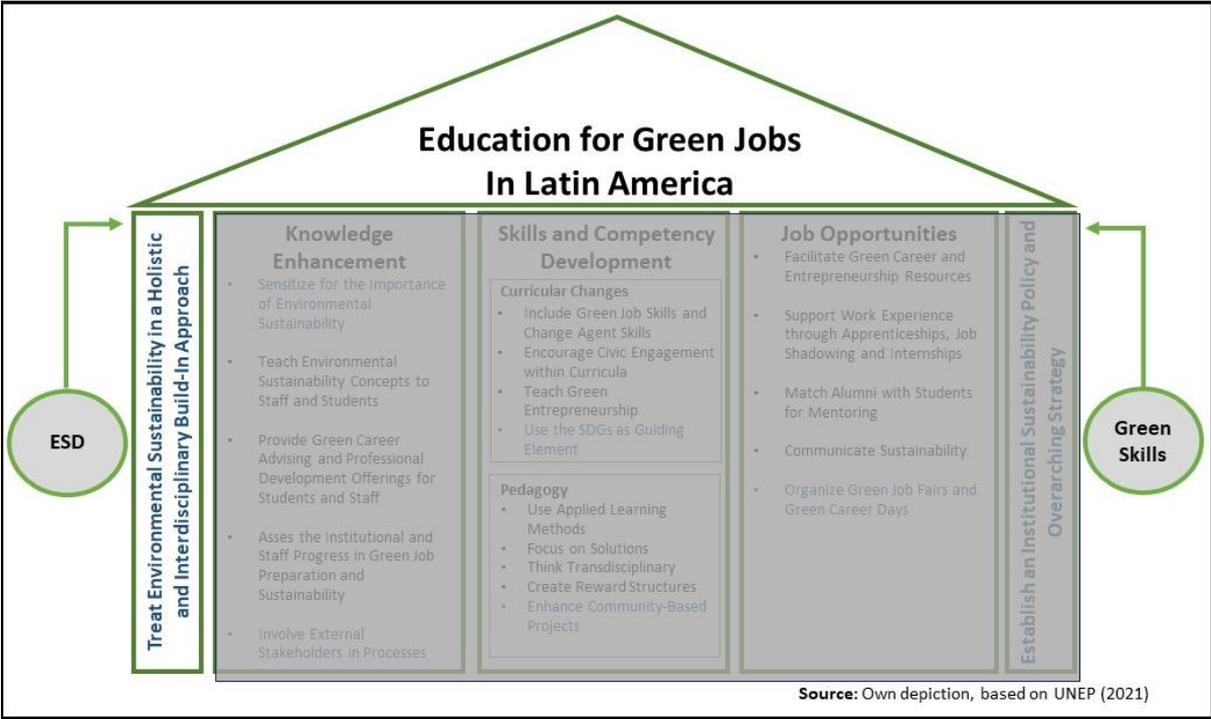
7.1 Green Job Preparation by Universities in Panama and Costa Rica

This study looks at the green job preparation initiatives in six universities situated in Panama and Costa Rica, encompassing two private institutions and one public university in each country. UNIPA-1 and UNIPA-2 are private universities and UNIPA-3 a public university in Panama. In Costa Rica, UNICR-1 and UNICR-2 are private universities and UNICR-3 a public university. The chapter is structured into five sections, following the thematic areas of the Education for Green Jobs in Latin America Framework. For each pillar of the framework, the author will first compare the universities in Panama, then in Costa Rica and finally compare both countries.

7.1.1 Treat Environmental Sustainability in a Holistic and Interdisciplinary Build-In Approach

Pillar one of the Education for Green Jobs in Latin America Framework states that universities should treat environmental sustainability in a holistic and interdisciplinary build-in approach (Figure 6).

Figure 6: Pillar 1 - Education for Green Jobs in Latin America Framework



Panama

Treating environmental sustainability holistically and in an interdisciplinary build-in approach is a challenge for all three Panamanian universities. UNIPA-1 aims to consider sustainable development aspects in all their activities and to sensitize all students, staff and teachers for the topic (Interviewees 5, 9). Yet, the lack of teacher training and green career resources facilitation (see following chapters) shows that UNIPA-1 fails to deliver on its own ambitions. Similarly, UNIPA-2 claims to treat “environmental sustainability as a cross-cutting theme” (Interviewee 6). However, the assessment of different degree curricula shows that while environmental sustainability is mentioned in all degrees, the topic is not included holistically throughout different courses (Appendix 1). Further, students criticised that the university’s activities are often isolated, and that UNIPA-2 is “still lacking a lot on the subject” (FGD 6, Student 1). Lastly, none of the interviewees from UNIPA-3 claimed that the university is dealing with the topic holistically in all areas.

Overall, none of the universities treats sustainability holistically and as a cross-cutting theme in all courses. In their research, Hofmann and Strietska-Illina (2014) establish that this is what

differentiates well-developed and responsive education systems from others and should therefore be aimed for. UNIPA-1 has, in comparison, still the most coherent and holistic approach that tackles many of the areas mentioned in the *Education for Green Jobs in Latin America Framework*.

Costa Rica

In Costa Rica, the situation appears to be different. UNICR-1 “was founded with the vision of sustainability” (Interviewee 20) and includes sustainability in all courses (Appendix 1). Their holistic sustainability approach is clearly outlined in the institutional strategy and addresses all areas of *the education for green jobs framework* (Interviewee 17). UNICR-1 put forward many good curricular and co-curricular initiatives for the green jobs’ preparation of their students. Likewise, UNICR-2 has established the strategic goal to promote “planetary regeneration” in all degrees of the four faculties and in the entire university (FGD 8, Student 3). The concept of regeneration comes from UNICR-2s understanding that we have already passed the planetary boundaries and must therefore go beyond sustainable practices (Interviewee 18). In line with the strategic goal, UNICR-2 includes environmental sustainability holistically in a build-in approach in all degrees (Appendix 1). None of the study participants from UNICR-3 expressed that the university is dealing with the topic holistically.

In general terms, both private universities treat environmental concepts as a cross-cutting and holistic issue. This contrasts with UNESCO's (2020) findings, which show that most universities only take a narrow view rather than a holistic approach to the issue. UNICR-3, on the other hand, does include environmental aspects in some of its degrees and activities, but fails to incorporate the topic holistically.

Comparison of both Countries

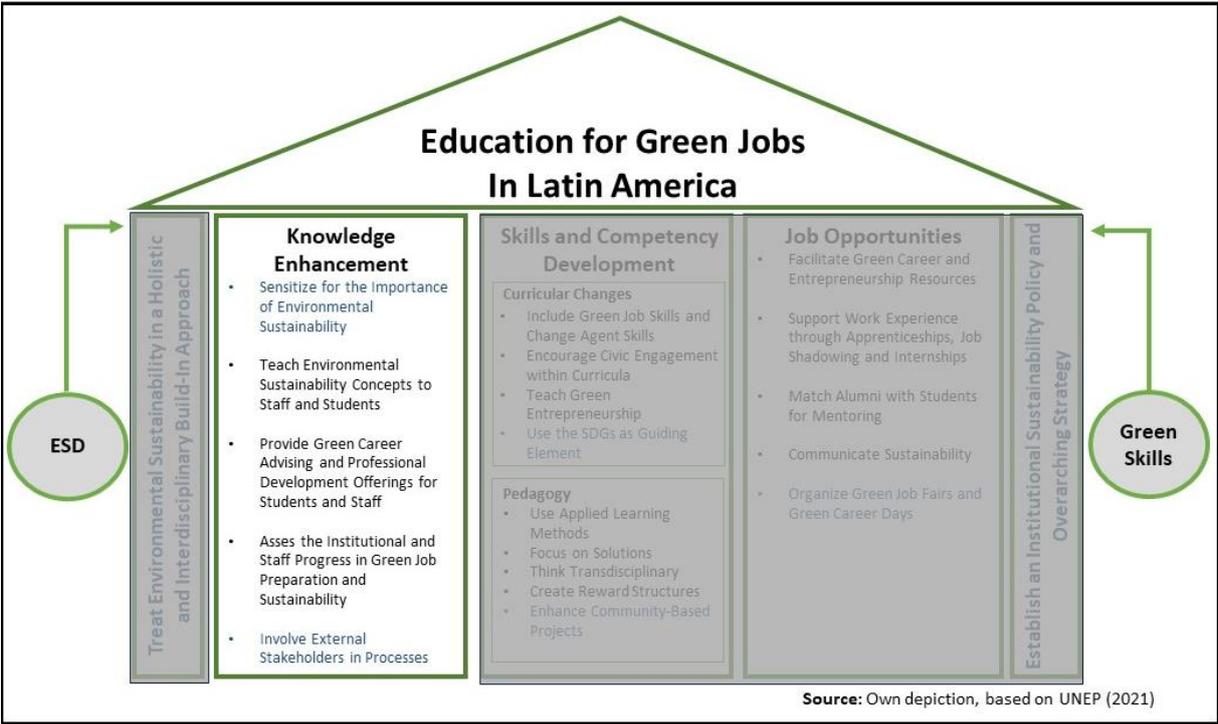
All universities analysed in this study mention (environmental) sustainability as a strategic goal. Staff from all universities ensured that the university has a sustainability strategy that is often divided into two focus areas: education and institutional management. However, the document analysis as well as critical voices from the students show that the majority of the universities fail to implement their goal in practice. In both countries, private universities are putting more emphasize on environmental topics compared to the public universities. These findings contrast previous research on by Garcia (2010) who showed that for Costa Rica, public universities are incorporating sustainability more holistically. A possible explanation is the time gap between the research, showing that private universities are quicker in adapting to the new green job market demands. Further, findings suggest that environmental issues are primarily treated as a cross-cutting issue in the universities in Costa Rica. These results are in line with the general research on Costa Rica’s sustainability efforts, which show that in Costa Rica in

general, environmental sustainability is treated as a cross-cutting issue (ITCR, 2013; ILO, 2018).

7.1.2 Knowledge Enhancement

In the area of knowledge enhancement, universities are analysed regarding their teacher training and students’ sensitization efforts. Further, their collaboration with external stakeholders in environmental sustainability topics is assessed (Figure 7).

Figure 7: Pillar 2 - Education for Green Jobs in Latin America Framework



Panama

All three universities in Panama have well established cooperations with external stakeholders. For example, ever year 15-20 students from UNIPA-1 are selected to learn more about the SDGs and exchange with students from Costa Rica and Colombia. In like manner, UNIPA-3 is part of a national committee for ocean protection where the university actively engages in sensitization events (Interviewee 12). All three universities actively participate in RUPADES, where they collaboratively organise meetings and sensitization events (Interviewee 5, 9, FGD 3, Students 1, 2).

Students and staff from all universities emphasized the importance of co-curricular activities. Additionally, to previously mentioned cooperations, UNIPA-1 organizes volunteering activities such as tree planting, recycling or beach cleaning (FGD 1). Likewise, UNIPA-2 actively engages in community sensibilization activities, as well as recycling competitions and

conservation initiatives. These activities are highly appreciated by students and serve as inspiration, sensibilization and networking event (FGD, Student 1).

To comply with the law, UNIPA-1 and UNIPA-2 included a mandatory environmental education course in all degrees. The basics of the environmental course are the same for all students in UNIPA-2, and some parts of the course are adapted to the specific area of the degree (Interviewee 6). Some of the topics that are discussed in the course are: contamination, conservation, nature protection, ecosystems and communities (Interviewee 10). Since these topics cover a broad area of activities, it is noteworthy that pressing issues such as the climate crisis are not mentioned. UNIPA-3 on the other hand, does not incorporate an environmental education course in all degrees and thus fails to comply with mandatory regulations (Interviewee 7). This not only reflects poorly on the university's sustainability efforts, but also has negative implications for preparing students for a green transition. This perspective is supported by Interviewee 12 who explains that the university is not incorporating environmental sustainability as a cross-cutting theme in their degrees. Positively, the analysis of different degree curricula shows that environmental sustainability is still mentioned in three of the four degrees (Appendix 1). Analogously, three of the four analysed degrees have a separate course on environmental sustainability. While this seems quite positive, results must be treated with caution. As explained in the methodology chapter, a bias during the selection of degrees might distort the results.

Regarding student and teacher sensibilization, most students and staff showed a narrow sustainability understanding during the interviews and focus groups, focusing on reforestation and waste as the main environmental issues. It seems that sensitization efforts for all aspects of the triple planetary crisis are lacking. However, the focus of students on waste and reforestation suggests that the previously mentioned co-curricular activities help to sensitize students for environmental issues.

Continuous teacher trainings are a helpful tool to ensure high pedagogical and thematic standards. Both, UNIPA-1 and UNIPA-2 do not offer mandatory trainings for their teachers. Though, teachers are invited to participate in workshops and other additional activities (Interviewees 6, 9, 10, 11). Meanwhile, UNIPA-3 acknowledges the importance to train and prepare teachers properly and has established a strong teacher training system, a demand also raised by all students during FGD 3. "Training is always given to the teacher. The university has a policy that all teachers, all lecturers, must take at least three courses per year in our internal teaching programme" (Interviewee 7), but not specifically sustainability related.

Summarizing, all universities have established strong connections to external stakeholders with whom they organize different sensibilization and volunteering activities. Conversely, findings suggest that the current teacher and sensibilization efforts are not enough. In line with

the findings by Betour El Zoghbi and Lambrechts (2019), the lack of teachers training results in limited awareness about important environmental issues such as the climate crises among students. Including environmental education in all degrees is not enough when teachers are not prepared sufficiently.

Costa Rica

All three universities in Costa Rica are part of REDIES. Research participants appreciate the knowledge sharing, agenda setting and collaboration that is possible through REDIES (Interviewees 17 - 22). Additionally, all universities have established relations to external stakeholders to foster students' networking and career chances and organize collaborative projects (Interviewees 17-19, FGDs 8, 10).

Outside the classroom, only UNICR-1 and UNICR-2 facilitate co-curricular activities. UNIPA-1 offers volunteering activities, innovation competitions, sustainability talks and many other activities that are highly appreciated by students (FGD 1 and 2). UNICR-2 is leading two environmental initiatives at national level, one is called 'Regenerative Costa Rica' and the other is 'Living Soils', which is about livestock farming (Interviewee 18). Research participants from UNICR-3 on the other hand do not mention many co-curricular activities.

A high environmental sensitization is a requirement for teacher selection and also expected from all students graduating from UNICR-1. During the FGDs, students discussed a wide range of environmental topics, such as “the negative impacts on extensive fertilizer use” (FGD 7, Student 1), “the amount of food waste” (FGD7, Student 3), CO₂ emissions of different modes of transportation (FGD 10, Student 2) or “appropriate recycling of electronic devices” (FGD 10, Student 3). Their discussion showed in-depth understanding of the triple planetary crises. Similarly, Interviewee 17 states that UNICR-1s’ “graduates show in general a high sensibility for sustainability topics”. When examining the reasons behind the high environmental sensibilization of students and staff, it becomes clear that UNICR-1 is tackling the issue on multiple fronts: pedagogy, teacher training, co-curricular activities, institutional sustainability management and career support. To sensitize all students for the concept of regeneration, UNICR-2 includes one session on the topic in the mandatory introduction session for all students and staff (Interviewee 21). During FGD 8, all students showed a good understanding of the regeneration concept as well as high sensibilization for different environmental issues (FGD 8). Possibly, the holistic inclusion of all aspects of the triple planetary crisis in all degrees fosters this high awareness. While students and staff from UNICR-3 seem to have a wide understanding of environmental sustainability (e.g. carbon emissions, waste management, resource protection etc.), the university's efforts to improve environmental awareness appear limited. Only two of the four degrees analysed mention environmental sustainability and treat it holistically and in-depth in their courses (Appendix 1).

However, when it comes to teacher and staff preparation, UNICR-3 has implemented several training mechanisms that also incorporate environmental components.

“For teachers, we offer a variety of trainings and scholarships. On the environmental side we also link this to a series of training courses that are at the public sector level in Costa Rica, so specialised training courses with experts in different fields where there is collaboration not only between universities, but also with the public sector” (Interviewee 19).

In UNICR-1, all teachers must take a mandatory introduction course that includes a short section on sustainability topics (Interviewee 17). Further, they can participate in all co-curricular activities and receive institutional support to take external classes for career development (Ibid.). Similarly, UNICR-2 has a teacher actualization programme that also includes pedagogical and sustainability concepts (Interviewee 18). In contrast, Interviewee 21 points out that UNICR-2 could do more to prepare teachers better. Correspondingly, students expressed their disappointed that “teachers sometimes know very little and were not very clear about the concept in their classes” (FGD 8, Student 3).

In summary, students from all three universities showed a good understanding of environmental problems and the triple planetary crises. While it remains unclear whether this can be linked directly to the universities’ efforts, it shows a high sensitization among students for environmental issues. Furthermore, all universities acknowledge the importance of teacher training and provided general and sustainability related trainings to their teachers. Consistent with the results from Blanco-Portela et al. (2018), the results show that well prepared and sensitized teachers are crucial for students’ awareness too. However, findings from UNICR-2 suggest that the quality and extent of teacher trainings are still sometimes inadequate. Aligned with the findings of Donald et al. (2018), this suggests that it is important to listen to those that experience the classes themselves for a comprehensive understanding of teaching quality.

Comparison of both Countries

All 6 universities are part of the university network ARIUSA, through their national sustainability networks RUPADES and REDIES. Further, all universities have established collaborations with external stakeholders. These partnerships are vital for the preparation of students for green jobs. However, instead of seeing the added value only in preparing their students, universities should also consider this as a way to drive social change (Leal Filho et al., 2019).

Addressing environmental issues in at least one course can increase students environmental awareness significantly (Strietska-Illina et al., 2012). In Panama, all universities are obliged by law to incorporate an environmental education course in all degrees. Therefore, it comes as a surprise that during the FGDs, students in Costa Rica showed a higher sensitization for

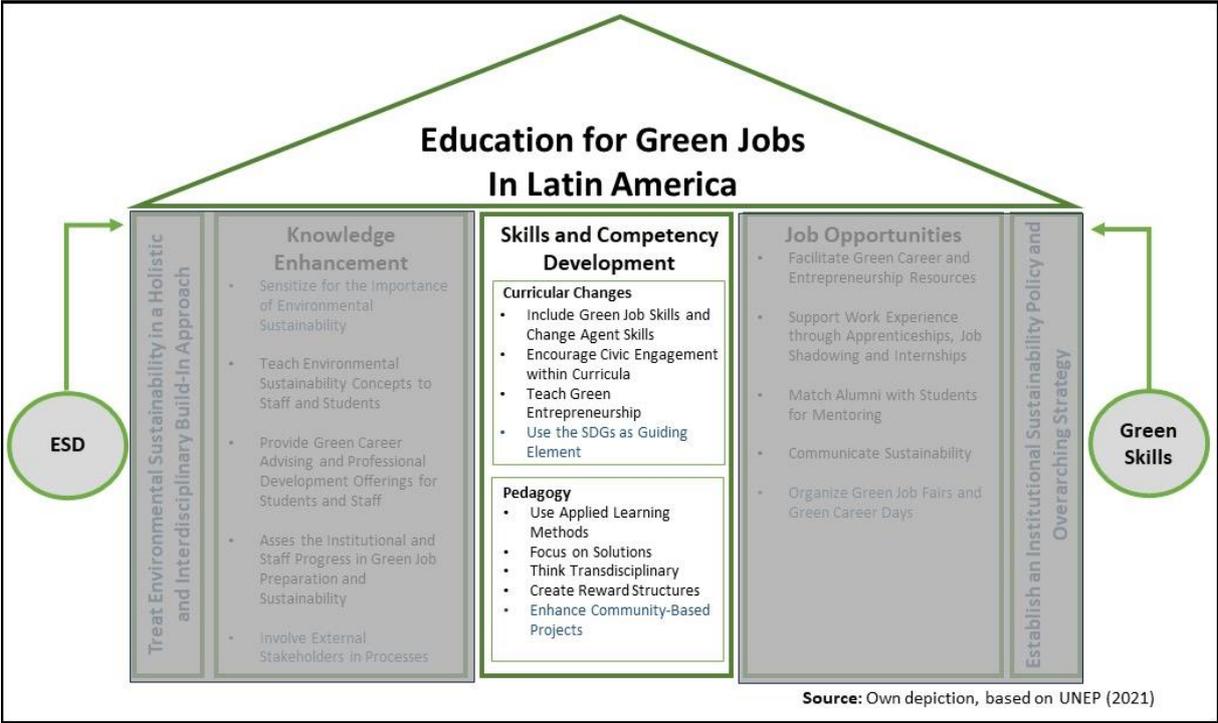
complex environmental issues than students in Panama. A possible explanation is that UNICRA-1, UNICRA-2 and UNICRA-3 include sustainability more holistically in their degrees. A further explanation could be a lack of adequately prepared teachers in Panama.

One of the most significant differences between the cases in Panama and Costa Rica is the degree of teacher training. In Panama, only UNIPA-3 has a well-established teacher training system, while in Costa Rica all universities have a teacher training system. These results coincide with findings from González and Alberto (2017) who show that there are big differences between Latin American countries regarding continuous teacher education. In both countries, public universities are the once that are best positioned regarding (mandatory) teacher trainings. Nonetheless, none of the universities has mandatory targeted sustainability teacher courses that are repeated and updated regularly.

7.1.3 Skills and Competency Development

According to the *Education for Green Jobs in Latin America Framework*, skills and competency development activities can be divided into two different areas: curricular changes and pedagogy (Figure 8).

Figure 8: Pillar 3 - Education for Green Jobs in Latin America Framework



Panama

Concerning curricular changes, UNIPA-1 has highlighted in its institutional strategy a variety of skills, such as critical thinking, innovation, entrepreneurship, communication or being able to work in a team, that it wants to impart on students (Interviewees 8, 9). To teach those skills,

UNIPA-1 incorporated mandatory community work hours for all students in the curricula (Appendix 1, FGD 2, Student 2, 3, 4). Likewise, Interviewee 11 emphasizes that UNIPA-2 tries to teach students relevant life skills that will help them in their future career. Their strong focus on communication and entrepreneurship skills were emphasized by Interviewees 6 and 10. One measure that was implemented by all universities is to make social hours mandatory for all students before graduating (Appendix 1).

All universities place great value on practice-based teaching. In UNIPA-1 and UNIPA-3, students have a mandatory internship as well as different entrepreneurship training opportunities in their degrees (Interviewees 5, 7, 12). To finish their degree, all students in UNIPA-2 must develop a final project (Interviewee 12). Students in all universities mentioned field trips as an additional practice-based activity they experienced and appreciate. While this was also mentioned as a pedagogical tool by administrative staff, there is no institutional requirement for it being included in courses (Interviewees 7, 9 11). “Every teacher has their own particular way of working with the subject” (Interviewee 11). More generally, the responsibility for the class design and pedagogy in all universities lies with the teacher.

All in all, all three universities show some good practice-based pedagogy examples that enable them to transmit the skills they identified as relevant to their students. In line with green economy market demands, all universities put an emphasize on entrepreneurial skills in their curricula (Strietska-Ilina, 2019). The (soft) skills prioritized by the universities resemble the list of relevant green skills identified in the literature review (Strietska-Ilina *et al.*, 2012; Thomas, Barth and Day, 2013; LinkedIn Economic Graph, 2022). In agreement with the research from Lee (2013), the universities are adapting to the skills demand from the labour market.

Costa Rica

In Costa Rica, the transition to a green economy and therefore the demand for green skills is already present. UNICR-1 has green skills mapped out in its teaching strategy and is “emphasizing different methodologies and pedagogies to teach” (FGD 2, Student 1, Appendix 1). When it comes to teaching pedagogy, Interviewee 22 explains that UNICR-3 has clearly identified soft skills, such as communication, leadership and other interpersonal skills, that it wants to transmit through action-based learning. In like manner, UNICR-2 hosts a social entrepreneurship hub to support students to become entrepreneurs with purpose. These offers are intended to transmit valuable soft skills, such as innovation thinking and problem-solving skills, through practical experience. In the same way, a strong entrepreneurship focus in UNICR-1 is set by a multi-year social entrepreneurship programme (Interviewees 17, 10).

Additional practice-based pedagogical components that were implemented across all three universities are field trips and project work. In UNICR-1, “Nearly 90% of the courses have a

final project (...) that involves developing a product or some innovation process” (FGD 1, Student 2). Comparably, in UNICR-2 all students finish their degree with a final project instead of a thesis (Interviewee 21). In UNICR-3, community work plays a particularly important role (Interviewee 22). Yet, the community work aspect was discussed the most in FGD 9. Students expressed their discomfort about going to communities, investigating them for practice “without any benefits for the community” (FGD 9, Student 2). Other students added that they do not feel prepared for the community work (FGD 9, Student 1) and that from their point of view, even the teachers lack the capacity to work with communities (FGD 9, Student 3).

Overall, all three universities in Costa Rica have established clearly what (soft) skills they want to teach students and how they plan to do that. Harmonizing with the results from McPherson et al. (2016), the universities recognize the positive effects of practice-learning experiences, such as internships, on student competencies. Nonetheless, all universities lack civic engagement components within the curricula as well as well-managed community activities. These results extend the findings of Hernandez et al. (2018), who found an absence of community engagement mostly from private universities in Latin America. While this is also true in this study, findings suggest that the quality and extend of community activities from the public university UNICR-3 are also insufficient.

Comparison of both Countries

In terms of green skills, all universities have clearly established what soft skills they want to transmit and how to do that. In all cases, these are aligned with the most commonly requested green skills (LinkedIn Economic Graph, 2022).

Applied learning components were mentioned as important aspects for all degrees in all 6 universities, with field trips being the most frequently one stated. Other practice components such as internships, case studies or project work occur in some of the universities in both countries. There is no clear pattern whether these are more frequent in private or public universities’ or in any of the two countries. By including different practice-based activities in their teaching, the universities incorporate an important ESD methodology that strengthens the behavioural learning dimension (UNESCO, 2020).

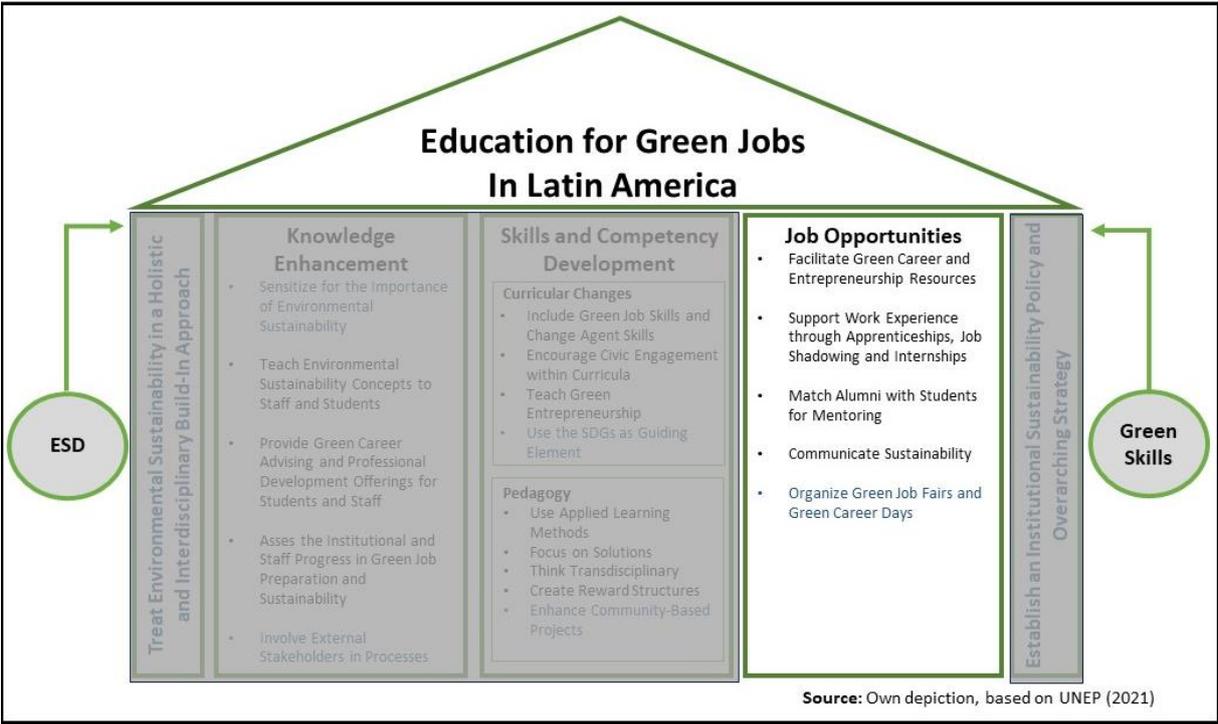
Comparing the level of community engagement, all Panamanian universities have implemented several targeted measures to encourage community work of their students (e.g. mandatory social hours). In comparison, the Costa Rican universities’ community engagement activities fall short. These results contrast with Garcia's (2010) findings, which indicate that the community engagement of universities in Costa Rica is rather high. A possible explanation for these differences is that in this thesis, the author also examined the quality and extend (e.g.

mandatory social work) of the community work, while Garcia rather focused on the existence of community initiatives.

7.1.4 Job Opportunities

To strengthen (green) job opportunities for their students, universities can inter alia facilitate green career and entrepreneurship resources, support work experience and organize green job fairs (Figure 9).

Figure 9: Pillar 4 - Education for Green Jobs in Latin America Framework



Panama

In cooperation with the private sector, UNIPA-1 offers job application trainings, networking events and career advice (FGD 1, Student 1, 3 and FGD 2 Student 1). Further, the university organises mentorship programs for their students with mentors coming from the private sector (Interviewee 5). A mandatory internship for all students is included in the degrees (Appendix 1, Interviewee 9). In addition to prepare students to find employment, it is important for UNIPA-1 to provide students with the skills to start their own business. Therefore, the university hosts an incubation hub for students who want to realize their own idea (Interviewee 5).

“This university has always been known for being a university of entrepreneurs and in this way of being entrepreneurial. Since its inception, the idea of the university has been that students should not be dependent on a job, but that they should also be able to be entrepreneurs with the knowledge and skills relevant to being an entrepreneur” (Interviewee 5).

Lastly, UNIPA-1 offers a variety of career resources to help students to find a job, e.g. through job fairs or by providing access to an exclusive job database. However, not all students are aware of these offers. During the FGDs one student claimed that she is “hearing this for the first time” (FGD, Interviewee 2). Similar criticism was raised on the career support offered by UNIPA-2 (FGD 2). While one student felt that UNIPA-2 is not providing any support, another student listed several activities offered by the university (FDG 6, Student 1, 2). Analogously to UNIPA-1, UNIPA-2 provides access to an exclusive job database for the students (Interviewee 11, FGD Student 2). Further, some professors share employment opportunities that they received via their personal network with their students (Interviewee 10, FGD Student 2). Meanwhile, the only activities from UNIPA-3 in this area is the inclusion of mandatory internships in all degrees.

In conclusion, UNIPA-1 has a very well-established career support system and UNIPA-2 some important offers. Contrarily, UNIPA-3 disregards career support for their students. Brundiers et al. (2021) found that universities in the U.S. face intense pressure to provide deeper career support to their students. In accordance with these findings, a possible explanation for UNIPA-1s and UNIPA-2s strong focus on career support is that, as private universities, they must react more quickly to the students’ changing needs and requirements for increased career support. Coherent with the research from Donald et al. (2018) the universities must focus more on raising students’ awareness of the existing career support resources provided by the university.

Costa Rica

In Costa Rica, the situation is different. UNICR-1 has an internship database to help their students find an internship. Moreover, career resources are sometimes shared by the professors. This type of career support is more unstable since it lacks institutionalization and depends on the professors good-will. Nonetheless, in the case of UNICR-1, students expressed their satisfaction with the quantity and quality of information shared (FGD 2). Meanwhile, UNICR-2 and UNICR-3 have no established career support system. “I don’t know of anything but if they have something, they are communicating it badly” (Student 1), “I haven’t seen anything” (Student 2) and “it is not part of their ideology” (Student 3) were just some of the statements from UNICR-2 students. Likewise, Interviewee 19 explains that UNICR-3 focuses on “education and not on labour market insertion”. Nonetheless, some UNICR-3 professors provide career resources to their students through informal channels, such as social media, website posts or emails (Interviewee 21).

To summarise, all three universities have no or only weak career support systems for their students. The lack of institutional career support in the analysed universities contrasts the findings from Garcia (2010), who showed that already in 2010 half of the public universities and some of the private universities in Costa Rica provided *green* career support. In this

research, none of the universities provides *green* career resources and only UNICR-1 offers some career support. These findings also diverge from other observations that found an increased pressure on universities to support students in their career paths (Brundiers *et al.*, 2021)

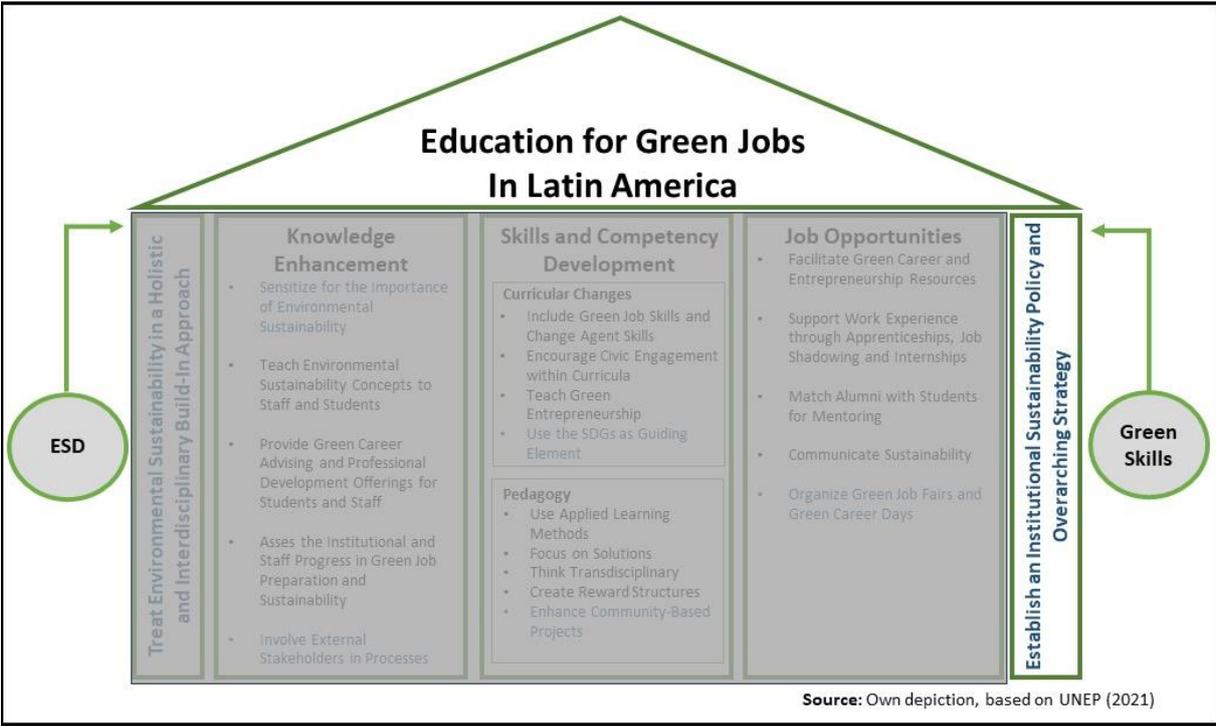
Comparison of both Countries

Compared to the universities in Costa Rica, UNIPA-1 and UNIPA-2 offer a greater variety and more career support to their students, such as job fairs, employment databases or CV trainings. Similarly, differences between the two countries were observed in terms of entrepreneurship activities. While all universities in Panama have entrepreneurship established as a strategic goal, in Costa Rica only the private universities have specific entrepreneurship offers. In line with the theoretical framework and previous findings by Altenburg and Assmann (2017), teaching students entrepreneurial skills important for a green transition. In both countries, private universities seem to focus more on entrepreneurship training and career support than public universities. UNIPA-3 and UNICR-3 facilitate nearly no career resources to their students. In both cases, university staff states that job facilitation is not a task of the university (Interviewees 7, 19). These observations are contradictory to the findings by Garica (2010), who found that public universities in Costa Rica are, in general, providing career support for their students. In line with previous explanations, this could be vindicated by the more demand-driven and responsive structure of private universities. Lastly, none of the universities has implemented targeted measures for the facilitation of *green* jobs.

7.1.5 Establish an Institutional Sustainability Policy and Overarching Strategy

To avoid isolated efforts that tackle only some of the areas described in the *Education for Green Jobs in Latin America Framework*, universities should establish an overarching sustainability strategy (Figure 10).

Figure 10: Pillar 5 - Education for Green Jobs in Latin America Framework



Panama

In the case of Panama, UNIPA-1 has a well-established institutional strategy that distinguishes ten different priority areas, one of them being sustainable development (Interviewees 5, 9). Their sustainability efforts are divided into two different areas:

1. Environmentally friendly practices in the university, such as waste management or energy; and
2. Sensitizing teachers and students for sustainability topics.

In its strategy, UNIPA-1 has established (green) skills the university aims to impart on its students. UNIPA-1 measures progress in both areas through different indicators to track advancements in the different areas and to hold itself responsible for its own claims. It is noteworthy that this assessment is done internally with no externals involved (Interviewee 8). While UNIPA-3 has not established an overarching institutional sustainability strategy, it has implemented “wider environmental management measures” (Interviewee 12). These entail energy saving and waste reduction measures as well as efforts to support paperless work. However, UNIPA-3 has not implemented any monitoring systems yet. For UNIPA-2, the only indication regarding a sustainability strategy was made by Interviewee 6, who said that “sustainability” is part of the institutional strategy.

In summary, only UNIPA-1 has an established sustainability strategy that addresses all university areas. Establishing a strong sustainability strategy is not only important to ensure coherence but can also be beneficial for communication purposes (Yuan, Zuo and Huisingh, 2013). Therefore, UNIPA-2 and UNIPA-3 should prioritize designing a coherent institutional sustainability strategy.

Costa Rica

In Costa Rica, UNICR-1 and UNICR-2 were founded with the vision of sustainability (Interviewees 18, 20). UNICR-1s sustainability approach is clearly outlined in the institutional strategy and addresses all areas of *the education for green jobs framework*. The university has implemented measures to reduce carbon emissions, improve waste and water management and other resource protection efforts. Constant evaluations take place through an internal monitoring. Similarly, UNICR-2 implemented different resource use reduction measures (e.g. composting, recycling and sustainable transportation) and monitors them closely (Interviewee 2). As a public university, UNICR-3 is obliged to comply with additional regulations. In line with the country's strategy to become carbon neutral by 2050, public universities must implement sustainable institutional management measures (CONARE, no date). Therefore, UNICR-3 has implemented an environmental management strategy and is monitoring progress through different indicators (Interviewee 19). Equally to UNICR-1 and UNICR-2, the university reports the indicators to REDIES and additionally to an SDG university ranking to position itself as a sustainable organisation externally (Ibid.).

Concluding, the environmental management activities combined with the findings from pillar one suggest that UNICR-1s and UNICR-2s institutional strategy covers most of the important sustainability aspects. While UNICR-3 is positioned strongly in the area of environmental management, as described under pillar 1, it shows deficits in some other areas. These results also help to explain previous findings in the areas of knowledge enhancement and skills and competency development. As demonstrated by the UNESCO (2020), institutions themselves need to become sustainable in order to motivate learners to become change agents who have the knowledge, means, willingness and courage to take transformative action for sustainable development.

Comparison of both Countries

Comparing the universities in both countries, it becomes evident that sustainability efforts are more congruent and institutionalized in Costa Rica. Especially, UNIPA-2 should UNIPA-3 should work on an institutional strategy to advance their sustainability efforts. Regarding institutional management and resources protection efforts, all universities implemented some measures on waste reduction and energy saving. Notwithstanding, only UNIPA-1 and all three

universities in Costa Rica monitor progress, which are also the universities that cover more aspects of the *Education for Green Jobs in Latin America Framework*.

7.2 Green Jobs Preparation: Overall Comparison of Universities in Panama and Costa Rica

In conclusion, universities in Panama and Costa Rica show strength and weaknesses in different areas (Table 4). Table 4 ranks the efforts of each university under the different pillars of the Education for Green Jobs in Latin America Framework (High = Good Efforts, Medium = Some Efforts, Low = Weak Efforts).

Only UNICR-1 and UNICR-2 have established a *holistic and interdisciplinary sustainability approach*. Environmental topics are included as a cross-cutting theme in all subjects. On the contrary, universities in Panama have a narrower focus where environmental issues are dealt with through a top-up approach. These general results align with the findings from Garcia (2010) who concluded that both universities in Costa Rica are comparatively strong in the sustainability area.

The biggest challenge for all three universities in Panama will be to increase *knowledge enhancement* and environmental awareness for students and staff. Conversely, high environmental awareness and teacher trainings are a strength of the Costa Rican universities. Positive examples are here the sensitization for all aspects of the triple planetary crisis as well as continuous and mandatory (sustainability related) teacher trainings. Consistent with the results of Hernandez et al. (2018), the majority of the analysed universities still have much to do to establish a sustainable mindset in all stakeholders.

All three universities in Panama are strongly positioned in the area of *Skills and Competency Development*. In contrast, universities in Costa Rica show weaknesses in their civic engagement and community initiatives. Positive example from universities in Panama are the mandatory social hours for all students, which is something that could easily be implemented in Costa Rica too.

Further, two of the three universities in Panama have some good initiatives in the area of *job opportunities*. Meanwhile, the biggest weakness in Costa Rica is the lack of career support provided by the universities. Here, Costa Rican universities can learn from UNIPA-1 and UNIPA-2 who have well established career support systems. Coherent with the findings from Donald et al. (2018), in this research, most students expressed the feeling of being left alone in their job search.

Similarities to pillar one can be seen in the *institutional sustainability strategy* comparison. The universities that have established an overarching sustainability strategy are more likely to treat

the topic holistically. Especially UNICR-1 and UNICR-2 tackle environmental issues in all areas of the university, including sustainable resource management. According to the greening education guide by UNESCO-UNEVOC (2018), establishing an environmental management system and measuring progress is an important first step in the sustainability efforts of a university.

Lastly, similarities can be found between the four private universities and between the two public universities. In average, the private universities are more progressive in the green jobs' preparation of their students. Solely in the area of teacher training, public universities lead by example. These outcomes stand in opposition to the findings by Garcia (2010) who found public universities in Costa Rica to be more advanced in their sustainability efforts. As explained earlier, the changing "market" demand and the time gap between the research are potential explanations for these differences. The biggest weakness in both public universities is the lack of career support for their students.

Table 4: Case Comparison under the Education for Green Jobs in Latin America Framework

		Holistic and Interdisciplinary Sustainability Approach	Knowledge Enhancement	Skills and Competency Development	Job Opportunitites	Institutional Sustainability Strategy
Panama	UNIPA-1	Medium	Medium	High	High	Medium
	UNIPA-2	Low	Low	High	Medium	Low
	UNIPA-3	Low	Low	High	Low	Low
Costa Rica	UNICR-1	High	Medium	Medium	Medium	High
	UNICR-2	High	Medium	Medium	Low	High
	UNICR-3	Medium	High	Medium	Low	Medium

7.3 Areas for Improvement in Preparing Students for the Green Job Market in Panama and Costa Rica

After the in-depth analysis of six universities in Panama and Costa Rica, the following chapter will present possible areas and interventions for improvement in both countries. These were identified through interviews with the private sector, thematic experts and the students' perspectives in the FGDs. Further, they build on gaps identified in the case comparison in the previous chapter.

7.3.1 Areas for Improvement in Panama

As shown in the previous chapter, there is significant space for improvement for green jobs preparation in universities in Panama. In total, 10 recommendations are made.

1. Treating environmental sustainability holistically.

All universities have implemented actions in some of the areas presented in the *Education for Green Jobs in Latin America Framework*. However, none of the universities managed to establish a holistic strategy that addresses all areas. The new paradigms of the 21st century demand a holistic transformation of the educational system (Malik, 2018).

2. Increasing environmental awareness by implementing environmental topics into existing classes, as well as a mandatory introduction course on environmental sustainability.

“Sustainability must be part of this core foundation that all students are required to take, regardless of their degree path” (Interviewee 4). Providing a basic course to all students ensures that all have basic knowledge and awareness about environmental problems and potential solutions. As shown in the case analysis, it is important that the topics addressed in the course resonate with students to create more interest in the topic. On a more ambitious level, universities should embed sustainability in all courses and adapt the content to the degree paths (Interviewee 1 and 24). This built-in approach can be guided by the SDGs (Leal Filho *et al.*, 2019).

3. To increase students’ interests in environmental issues, universities should explain the damage each individual is causing to the environment but also showcase how we can create a positive impact with our actions too.

When asked what they would like to learn in university, students in all five FGDs mentioned that they would like to know more about the impact of their actions (FGDs 1 - 5). Students can only make informed decisions, if they know the external effects of their actions (UNEP and UNESCO, 2016). “Once we understand that we can lose the biodiversity that we currently have through unsustainable economic practices, we are more likely to change” (Interviewee 2). It is important to also show potential solutions and how students can make a difference in their later career (FGD 5, Student 2).

4. Teachers must be sensitized for, and stay up to date with, environmental issues and technological developments. (Students, Experts)

“It is important to train teachers first, because many professors don’t know what we are talking about” (Interviewee 23). Teachers act as multipliers. Increasing their environmental awareness

and understanding is crucial to transmit this knowledge later to students. Further, teachers must attend regular trainings to remain up to date since “the environmental field is constantly changing with new findings being published every day” (FGD 4, Student 4). This will also make the class more interesting for students (FGD 3, Student 1).

5. Incorporating real world problems in the classroom through case studies and problem-based learning components.

The criticism that academia often acts isolated from the real world is not new. It comes as no surprise that students and staff emphasised the importance of practice-based learning components. One method that was mentioned by several students in FGD 1 and 3 is to include more case analyses with cases from the real world. This enables students to apply their skills and knowledge to situations they will face in their working life (McPherson *et al.*, 2016).

6. Increasing support for and encourage student initiatives.

Students are creative and often have great sustainability ideas. Official support from the university can help to kick-start their initiative (FGD 3, Student 2). Through innovation and sustainability competitions, students can be encouraged and supported to fulfil their own potential and realize sustainable projects (FGD 5, Student 1).

7. Organising green job fairs.

All Panamanian universities analysed in this case study have organised job fairs for their students. However, there is space for improvement in the organisation. Student 4 from FGD 3 expressed their disappointment with the choice of the companies being present (e.g. a call centre). The university could organise job fairs where at least some “green” companies are present (FGD 3, Student 3). In line, Boulanger *et al.* (2012) explain that green career fairs are useful for students to find an entry into the green jobs market.

8. Providing green job entry opportunities to students through internship programmes.

Internships often are a mandatory component of degrees in Panama. They provide students with first practice experience in their field and serve as an entry point into the labour market. Three of the four interviewees from the private sector stated that they often offer a fixed position to their interns after the internship. Universities must recognise that internships have a big impact on students’ career choices. “It could be a goal for universities to offer at least a certain share of their internships in placings that have a sustainability element so that the students are interested in this field” (Interviewee 24).

9. Establishing a database for green jobs and sustainability related internships that students can access, while simultaneously creating a database with all students that are looking for jobs for companies to access.

UNIPA-1 and UNIPA-2 are already providing their students access to an exclusive job portal where they can search for job opportunities. There, a separate category for green jobs could be included so that students who are interested in green jobs can specifically look for them (Interviewee 4). It is important to screen these jobs for greenwashing. Companies that are greenwashing are a major threat for sustainability efforts and giving them the space to promote their “green” jobs is dangerous and can disappoint students (Interviewee 26).

Universities that are looking for talented graduates can access the university’s database with all graduates that are looking for a job (Interviewee 1). The current gap between green skills supply and green skills demand increases the pressure on employers to find well-prepared labour force (LinkedIn Economic Graph, 2022). Thus, having access to a pool of properly trained graduates will be useful for employers.

10. Institutionalising current initiatives and offers.

Institutionalizing the university’s environmental commitment is an important first step (Interviewee 26). Having an institutional strategy will ensure that initiatives are not isolated from each other and that efforts are more coherent. Currently, many of the activities are dependent on the teacher’s choice or singular staff. By setting a guiding framework, universities can be held accountable to their promise and therefore will ensure that measures persist and expand over time.

7.3.2 Areas for Improvement in Costa Rica

As shown in the case comparison, universities in Costa Rica partly face similar difficulties but also show other weaknesses. Some of the recommendations for Costa Rica resonate with the suggestions made for Panama, while some are completely different.

1. Treat environmental sustainability holistically. Universities must consider environmental sustainability as a cross-cutting issue in all areas.

Similar to Panama, students in Costa Rica expressed their dissatisfaction with the Costa Rican universities not being coherent in their actions (FGDs 7 – 9). For further elaboration, refer to the improvement suggestions for Panama.

2. The university should realise its unique position to bring all different actors together to collaborate for a better future.

All three universities have already established collaborations with the public and private sector as well as other universities. The university can use its unique position to bring all actors together so that they can collaborate, think outside the box and find solutions for the problems this planet faces (Interviewee 14). In line with SDG 17 “Partnerships for the goals”, only together we can achieve the SDGs (UN, 2015).

3. Teachers must stay up to date with environmental issues and technological developments and should be evaluated critically on a regular basis.

Technology and the sustainability sector are advancing constantly (Interviewee 13). Sometimes, academia struggles to keep up with these rapid changes. Therefore, it is important that teachers regularly involve themselves in the real world to experience how the market and society are changing (Interviewees 13, 15). Additionally, universities have the responsibility to ensure that teachers are qualified to educate their students properly. Especially their pedagogy and environmental knowledge should be evaluated regularly (FGD 8).

4. Providing a basic introduction class on environmental topics for all students.

In line with the ESD pedagogy, all students should have some basic awareness of environmental issues (UNESCO, 2020). While it is a requirement by law in Panama to have an environmental education course in all degrees, there is no such requirement in Costa Rica. Giving a thematic introduction to all students should be minimum standard in all universities (Interviewee 24).

5. Updating the curricula regularly to keep up with the constantly evolving environmental topics.

The triple planetary crisis is worsening. Biodiversity loss, climate change and the amount of waste are reaching unprecedented levels. Therefore, “study plans must be revised constantly, also to reflect what changes are happening in the different sectors” (Interviewee 14).

6. Make community or volunteering work mandatory for all students.

A weakness identified in the case comparison was the community involvement of Costa Rican universities. Students from all three universities expressed their disappointment about the the university’s community efforts, in both quantity and quality (FGDs 7 – 10). Involving students more in community work can be very beneficial (UNESCO, 2020). Students emphasised that community activities must be done right. Universities should reflect on how community involvement can be facilitated best as well as the consequences of their community engagement (FGD 9).

7. Implementing action-based learning components, such as innovation competitions or project work.

Relevant green skills, such as innovation skills, critical thinking or creativity can be transmitted best through practice-based activities (Hofmann and Strietska-Ilina, 2014). Innovation competitions that are structured around the SDGs are well established in different Latin American universities and can also be implemented easily in all Costa Rican universities (Interviewee 26). Additionally, as final course work or even as thesis replacement, universities can implement project-based case work that connects students with the “field” (FGD 9, Student 1).

8. Providing more career specialisations in green focus areas (e.g. solar panel installation)

Labour market projections estimate that some sectors will grow significantly under the green transition (ILO, 2018). Resulting increases in jobs must be forecasted by universities and prevention measures established. There still is a lack of degree offers for area specific green jobs.

“I think that there is still no university programme, at least here in my country, that is directly focused on photovoltaic energy. There is no course as such at university level, but rather we still find only the more traditional courses in electromechanics and so on. There is no degree course or specialisation that is totally oriented towards photovoltaic energy. That would be the first point to improve“ (Interviewee 13).

9. Universities should have a database for green jobs and sustainability related internships that students can access. Further, they can establish a database with all students that are looking for jobs for companies to access.

The university should not only support students in finding a green job but also promote them and “put them for sale” (Interviewee 16). For further explanation refer to the suggested improvements for Panama.

8. Conclusion, Recommendations and Further Remarks

In conclusion, this study has delved into the pressing issue of green job preparation in Panamanian and Costa Rican universities, uncovering their strengths, gaps, and opportunities. The 6 universities examined in this thesis show strengths and weaknesses in different areas.

The study revealed that the three universities in Panama tend to focus on narrower environmental issues with a top-up approach, while the three Costa Rican universities adopt a holistic and interdisciplinary approach, integrating sustainability measures across various

areas. Challenges for Panamanian universities lie in enhancing knowledge and environmental awareness, while Costa Rican institutions excel in teacher training and environmental sensitisation. Panama's universities demonstrate strength in skills and competency development, while Costa Rican institutions show weaknesses in civic engagement and community initiatives. Two of the three Panamanian universities have commendable initiatives for their students' career support, whereas Costa Rican universities lack sufficient job resources facilitation. Moreover, universities with overarching sustainability strategies tend to address environmental issues more comprehensively, as seen in UNICR-1 and UNICR-2. Private universities in both countries are more progressive in preparing students for green jobs, while public universities excel in teacher training.

This thesis has shown that universities in Panama and Costa Rica are open to supporting the green transition and incorporating green job preparation concepts into their academic programs. However, it has also revealed significant gaps and a lack of coherence in their actions, underlining the necessity for widespread and strategic transformations to effectively address the green skills deficit in the region.

To foster improvements in the universities green job preparation efforts, several general suggestions have emerged from the research, each holding the potential to catalyse sustainable change in Latin American higher education:

1. **Institutional Strategy over Isolated Projects:** A critical step for universities is to adopt an overarching, holistic institutional strategy that deeply integrates sustainability principles into their core values and practices. Building from a strong foundation of sustainability policy, universities can better align their efforts towards a unified green vision.
2. **Closing Knowledge Gaps:** Bridging the knowledge gap between students with extensive understanding of environmental issues and those with limited exposure is vital. This can be achieved through inclusive and comprehensive educational programs that empower all students with green skills and knowledge.
3. **Infusing Green Aspects into Everything:** To foster a culture of sustainability, green aspects should permeate all aspects of university life. For instance, incorporating sustainability concepts into entrepreneurship offers and extracurricular activities can create a sense of environmental responsibility among students.
4. **Promoting Multidisciplinary Collaboration:** Recognising the value of multidisciplinary collaboration, universities should actively encourage the establishment of multidisciplinary project work teams. Such teams can foster innovation and holistic problem-solving, leading to impactful solutions for sustainability challenges.

5. **Enhancing Problem and Value-Based Learning:** Incorporating more problem and value-based learning/teaching components will enable students to actively construct knowledge alongside their teachers. This approach empowers students to engage with real-world challenges and develop practical skills for sustainable development.
6. **Forecasting Labor Market Changes:** Universities should proactively forecast labour market changes and emerging demands within a green economy. By aligning their curricula with future green job requirements, universities can equip students with relevant and up-to-date skills for the evolving job market.

This qualitative study contributes valuable insights to the academic discourse on education for green jobs efforts in HEIs. The multiple case comparison addresses the existing research gap on education for green jobs in universities in Panama and Costa Rica by providing a comprehensive examination of the sustainability approaches and initiatives in these institutions. By revealing the strengths, challenges, and strategies employed by universities in both countries, the study offers valuable insights that can inform future policies and practices to enhance sustainability education and green job preparation in higher education contexts. Future research in this area should expand the scope on further Latin American countries to identify best practices and strategies for fostering green job preparation in higher education.

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10. Appendix

Appendix 1: Document Analysis Matrix

		Degree From:	Education For Green Jobs Components								
			Environmental Sustainability Mentioned	All Components Of Triple Planetary Crisis Addressed	Separate course On Sustainability	Sustainability Included Holistically	Volunteering / Community Work Included	Practice-Based Learning Components Mentioned	Green Skills Taught	Entrepreneurship Training	
Panama	University 1: UNIPA-1	Education and Social Sciences Faculty	Yes	No Information	Yes	No	Yes	Yes	Yes	Yes	
		Law and Political Sciences Faculty	Yes	No Information	Yes	No	Yes	Yes	Yes	No	
		Finance and Administration Faculty	Yes	No Information	Yes	No	Yes	Yes	Yes	Yes	
		Engineering and Informatics Faculty	Yes	No Information	Yes	No	Yes	Yes	Yes	Yes	
		Languages Faculty	Yes	No Information	Yes	No	Yes	Yes	Yes	No	
	University 2: UNIPA-2	Education and Humanities Faculty	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
		Administration Faculty	Yes	No Information	Yes	No Information	Yes	Yes	Yes	Yes	Yes
		Law and Political Sciences Faculty	Yes	No Information	Yes	No Information	Yes	Yes	Yes	Yes	No
		Technological Sciences Faculty	Yes	No Information	Yes	No Information	Yes	Yes	Yes	No Information	No
	University 3: UNIPA-3	Special Education and Pedagogy Faculty	No	No Information	No	No	Yes	Yes	No Information	No	
		Social Education and Human Development Faculty	Yes	No Information	Yes	No	Yes	Yes	No Information	Yes	
		Medical Sciences Faculty	Yes	No Information	Yes	No	Yes	Yes	No Information	Yes	
		Biosciences and Public Health Faculty	Yes	Yes	Yes	No	Yes	Yes	No Information	Yes	
	Costa Rica	University 1: UNICR-1	Food and Agrarian Sciences Faculty	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University 2: UNICR-2		Environment and Development Faculty	Yes	Yes	Yes	Yes	No	Yes	Yes	No Information	

		Law and Social Sciences Faculty	Yes	No Information	No	No	No	No Information	Yes	No
		Economics and Management Faculty	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
		Medical Sciences and Health Faculty	Yes	Yes	No	Yes	No	Yes	Yes	No Information
	University 3: UNICR-3	Administration Faculty	No	No	No	No	No Information	Yes	Yes	Yes
		Education Faculty	No	No	No	No	No Information	Yes	Yes	No
		Natural Sciences Faculty	Yes	Yes	Yes	Yes	No Information	Yes	Yes	No Information
		Social Sciences and Humanities Faculty	Yes	Yes	Yes	Yes	No Information	Yes	Yes	Yes

Appendix 2: List of Research Participants

Panama		Costa Rica	
RQ 2, Areas for Improvement			
Focus Group Private University 1 Panama	Focus Group 1, Student 1,2,3...	Focus Group Private University 1 Costa Rica, 2 Students	Focus Group 7, Student 1,2,3...
Focus Group 2 Private University 1 Panama	Focus Group 2, Student 1,2,3...	Focus Group Private University 2 Costa Rica	Focus Group 8, Student 1,2,3...
Focus Group Public University 3 Panama	Focus Group 3, Student 1,2,3...	Focus Group Public University 3 Costa Rica	Focus Group 9, Student 1,2,3...
Focus Group Private University 4 Panama	Focus Group 4, Student 1,2,3...	Private Sector Representative Energy Costa Rica	Interviewee 13
Focus Group 2 Private University 4 Panama	Focus Group 5, Student 1,2,3...	Private Sector Representative Electric Transport Costa Rica	Interviewee 14
Private Sector Representative Energy Panama	Interviewee 1	Private Sector Representative Eco-Tourism Costa Rica	Interviewee 15
Private Sector Representative Electric Transport Panama	Interviewee 2	Private Sector Representative Mining Costa Rica	Interviewee 16
Private Sector Representative Eco-Tourism Panama	Interviewee 3		
Private Sector Representative Sustainability Consultant Panama	Interviewee 4		
RQ 1, Universities Case Comparison			
Private University 1 Panama	UNIPA-1	Private University 1 Costa Rica	UNICR-1
Private University 2 Panama	UNIPA-2	Private University 2 Costa Rica	UNICR-2
Public University 3 Panama	UNIPA-3	Public University 3 Costa Rica	UNICR-3
Focus Group Private University 1 Panama	Focus Group 1, Student 1,2,3...	Focus Group 1 Private University 1 Costa Rica	Focus Group 7, Student 1,2,3...
Focus Group 2 Private University 1 Panama	Focus Group 2, Student 1,2,3...	Focus Group 2 Private University 1 Costa Rica	Focus Group 10, Student 1,2,3...
Focus Group Private University 2 Panama	Focus Group 6, Student 1,2,3...	Focus Group Private University 2 Costa Rica	Focus Group 8, Student 1,2,3...
Focus Group Public University 3 Panama	Focus Group 3, Student 1,2,3...	Focus Group Public University 3 Costa Rica	Focus Group 9, Student 1,2,3...
Sustainability Person Private University 1 Panama	Interviewee 5	Sustainability Person Private University 1 Costa Rica	Interviewee 17
Sustainability Person Private University 2 Panama	Interviewee 6	Sustainability Person Private University 2 Costa Rica	Interviewee 18
Sustainability Person Public University 3 Panama	Interviewee 7	Sustainability Person Public University 3 Costa Rica	Interviewee 19
Coordinator Curricula Private University 1 Panama	Interviewee 8	Coordinator Curricula Private University 1 Costa Rica	Interviewee 20
Academic Vice-Director Private University 1 Panama	Interviewee 9	Coordinator Curricula Private University 2 Costa Rica	Interviewee 21
Coordinator Curricula Private University 2 Panama	Interviewee 10	Coordinator Curricula Public University 3 Costa Rica	Interviewee 22
Coordinator Degrees Private University 2 Panama	Interviewee 11		
Coordinator Curricula Public University 3 Panama	Interviewee 12		
Thematic Experts			
Expert ILO		Interviewee 23 – Expert 1	
Expert UNESCO		Interviewee 24 - Expert 2	
Expert UNEP		Interviewee 25 – Expert 3	
Expert ARIUSA		Interviewee 26 – Expert 4	

10.3 Appendix 3: Interview Guide English

Focus Group Discussion Students: University Assessment

1. Please state your name, name of the university and your degree
2. Did you learn about environmental sustainability in your university? Where and how?
3. Did you learn about environmental sustainability topics in your degrees?
 - a. If yes, how?
 - b. What basics/theories/concepts/ideas are included?
 - c. Do you know if the university includes some of these components in all degrees?
4. How does the University prepare you for the different needs in terms of (generic) skills when entering green jobs / environmental sustainability work areas?
 - a. Do you notice this in their pedagogy/way of teaching/ focus on particular competencies?
 - i. If so, which?
5. Do you know if the University offers professional development and training opportunities for their professors and other university staff in the field of environmental sustainability or green economy?
6. Did you see any opportunities for students to apply their theoretical environmental sustainability knowledge in the real world.
 - a. What offers did you see?
7. Is the University doing any activities to strengthen the interest in environmental sustainability and green jobs for all students?
8. Have you heard of any green job opportunities activities offered by the University?
 - a. What do they do?
9. Do you like to mention any other actions that you noticed at your University regarding green jobs and environmental sustainability?

Sustainability Person and Public Administration Person: University Assessment

1. Please state your name, university and your position
2. Do you consider environmental sustainability in your university and how did you start thinking about it?
3. Do you include environmental sustainability topics in your degrees?
 - a. If yes, how and in which degrees?
 - b. What basics/theories/concepts/ideas are included?
 - i. Are there components that are included in all degrees?

4. How do you account for different needs in terms of (generic) skills of students who are entering green jobs / environmental sustainability work areas?
 - a. Did you make any changes in your pedagogy/way of teaching/ focus competencies in your university because of this?
 - i. If so, which?
5. Do you offer professional development and training opportunities for your professors and other university staff in the field of environmental sustainability or green economy?
6. Do you offer any other opportunities for students to apply their theoretical environmental sustainability in the real world.
 - a. What do you offer?
7. Are you doing activities at the university to strengthen the interest in environmental sustainability and green jobs for all students?
8. Do you organize green job opportunities activities at the University?
 - a. What do you do?
9. How do you measure your environmental sustainability activities and progress?
 - a. Do you have any certification accreditation in the area of environmental sustainability?
10. Do you like to mention any other actions that you implemented at your Universities regarding green jobs and environmental sustainability?

Focus Group Discussion Students: Improvement Suggestions

Give Definition of Green Jobs: The ILO defines Green Jobs as “decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency”.

Input Researcher: This can be any kind of job (Finance, Agriculture, Tourism, Transportation etc.).

1. Please state your name, university and current degree
2. Are you interested working in a “green job”? How did your interest in environmental sustainability start?
 - a. What do you think, how can universities strengthen the interest in environmental sustainability and green jobs in all students?
3. From your perspective, what are things that all students should learn when it comes to environmental sustainability?
 - a. Are there any concepts/ideas that should be included in all degrees?
4. Please list some (generic) skills that you believe are necessary for people wanting to focus on environmental sustainability in their area of work.

- a. How can these skills be taught in Universities?
5. When you think about your professors, what preparation should they receive in order to integrate these topics/skills more in their teaching?
6. What kind offers do you want to receive from universities to apply your environmental sustainability knowledge in the “real” world?
7. How do you hear about job opportunities or how do you find a job normally?
8. What can universities do to help you getting a “green job”?
 - a. What kind of programmes/offerings/resources that universities could offer would help you?
9. What other things do you wish from your university to be better prepared to enter the green jobs market?

Private Sector Interviews: Improvement Suggestions

Give Definition of Green Jobs: The ILO defines Green Jobs as “decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency”.

Input Researcher: This can be any kind of job (Finance, Agriculture, Tourism, Transportation etc.).

1. Please state your name, company and current profession
2. How did your interest in environmental sustainability start?
 - a. What do you think, how can universities strengthen the interest in environmental sustainability and green jobs in all students?
3. From your perspective, what are things that all students should learn when it comes to environmental sustainability?
 - a. Are there any concepts/ideas that should be included in all degrees?
4. Please list some (generic) skills that you believe are necessary for graduates wanting to focus on environmental sustainability in your area of work.
5. Please list some (generic) skills that you believe are necessary for graduates wanting to work in green jobs.
 - a. How can these skills be taught in Universities?
6. When you think about university professors, what preparation should they receive in order to integrate these topics/skills more in their teaching?
7. What kind of offers do you think would help students to apply their theoretical environmental sustainability knowledge in the “real” world?
8. How do you make graduates aware of your work and job openings? How do you find qualified graduates for your company?

9. What can universities do to connect students with “Green jobs” (in your area)?
 - a. What kind of programmes/offerings/resources that universities could offer would help you to connect with qualified students?
 - b. How can Universities help you with this?
10. What other things do you wish from the universities in order to prepare their students to enter the green jobs market and your work area more specifically?

Expert Interviews: Improvement Suggestions

1. Please state your name, organization and current profession
2. What do you think, how can universities strengthen the interest in environmental sustainability and green jobs in all students?
3. From your perspective, what are the things that all students should learn when it comes to environmental sustainability?
 - a. Are there any concepts/ideas that should be included in all degrees?
4. Please list some (generic) skills that you believe are necessary for graduates wanting to work in green jobs.
 - a. How can these skills be taught in Universities?
5. When you think about university professors, what preparation should they receive in order to integrate these topics/skills more in their teaching?
6. What kind of offers do you think would help students to apply their theoretical environmental sustainability knowledge in the “real” world?
7. What can universities do to connect students with “Green jobs”?
 - a. What kind of programmes/offerings/resources that universities could offer would help the private sector to connect with students that are interested in working in the green jobs sector?
8. What other things do you identify that universities should implement in order to prepare their students to enter the green jobs market?
9. How do you assess the current situation of universities in Latin America (and more specifically in Panama/Costa Rica) in this regard?

Students: University Assessment and Improvement Suggestions

Give Definition of Green Jobs: The ILO defines Green Jobs as “decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency”.

Input Researcher: This can be any kind of job (Finance, Agriculture, Tourism, Transportation etc.).

The structure of this will mostly be that I first ask you what you would like to see/have at universities and afterwards ask you what you actually received at the University.

1. Please state your name, age, gender, university and your degree
2. Are you interested working in a “green job”? How did your interest in environmental sustainability start?
 1. What do you think, how can universities strengthen the interest in environmental sustainability and green jobs in all students?
3. Did you learn about environmental sustainability in your university? Where and how?
4. Did you learn about environmental sustainability topics in your degrees?
 1. If yes, how?
 2. What basics/theories/concepts/ideas are included?
 3. Do you know if the university includes some of these components in all degrees?
5. From your perspective, what are things that all students should learn when it comes to environmental sustainability?
 1. Are there any concepts/ideas that should be included in all degrees?
6. Please list some (generic) skills that you believe are necessary for people wanting to focus on environmental sustainability in their area of work.
 1. How can these skills be taught in Universities?
7. How does the University prepare you for the different needs in terms of (generic) skills when entering green jobs / environmental sustainability work areas?
 1. Do you notice this in their pedagogy/way of teaching/ focus on particular competencies?
 - i. If so, which?
8. When you think about your professors, what preparation should they receive in order to integrate these topics/skills more in their teaching?
9. Do you know if the University offers professional development and training opportunities for their professors and other university staff in the field of environmental sustainability or green economy?
10. What kind offers do you want to receive from universities to apply your environmental sustainability knowledge in the “real” world?
11. Did you see any opportunities for students to apply their theoretical environmental sustainability in the real world.
 1. What offers did you see?
12. Is the University doing any activities to strengthen the interest in environmental sustainability and green jobs for all students?

13. How do you hear about job opportunities or how do you find a job normally?
14. What can universities do to help you getting a “Green job”?
 1. What kind of programmes/offerings/resources that universities could offer would help you?
15. Have you heard of any green job opportunities activities offered by the University?
 1. What do they do?
16. What other things do you wish from your university to be better prepared to enter the green jobs market?
17. Do you like to mention any other actions that you noticed at your University regarding green jobs and environmental sustainability?

10.4 Appendix 4: Interview Guide Spanish

Grupo de Discusión Estudiantes: Evaluación de la Universidad

1. Indique su nombre, nombre de la Universidad y carrera
2. ¿Han aprendido algo sobre la sostenibilidad medioambiental en su universidad?
¿Dónde y cómo?
3. ¿Aprendieron sobre temas de sostenibilidad medioambiental en sus titulaciones?
 - a. En caso afirmativo, ¿cómo?
 - b. ¿Qué fundamentos/teorías/conceptos/ideas incluyeron?
 - i. ¿Saben si hay componentes que se incluyan en todas las titulaciones?
4. ¿Cómo les prepara la Universidad para las diferentes necesidades en términos de competencias (genéricas) a la hora de acceder a empleos verdes / áreas de trabajo de sostenibilidad medioambiental?
 - a. ¿Lo notas en su pedagogía/forma de enseñar/centrarse en competencias concretas?
 - i. En caso afirmativo, ¿cuáles?
5. ¿Saben si la universidad ofrece oportunidades de desarrollo profesional y formación para sus profesores y demás personal universitario en el ámbito de la sostenibilidad medioambiental o la economía verde?
6. ¿Han escuchado de oportunidades para que los estudiantes apliquen sus conocimientos teóricos sobre sostenibilidad medioambiental en el mundo real?
 - a. ¿Qué ofertas han visto?
7. ¿Saben si la universidad realiza actividades para reforzar el interés en la sostenibilidad medioambiental y los empleos verdes para todos los estudiantes?
8. ¿Han escuchado de actividades sobre oportunidades de empleos verdes que organizó la Universidad?
 - a. ¿Cuáles?
9. ¿Desea mencionar alguna otra acción que han visto en su Universidad en relación con los empleos verdes y la sostenibilidad medioambiental?

Persona de Sostenibilidad y Persona de la Administración Pública Entrevistas: Evaluación de la Universidad

1. Indique su nombre, nombre de la Universidad y posición que ocupa
2. ¿Consideran la sostenibilidad medioambiental en su universidad y cómo empezó a pensar en el tema?
3. ¿Incluyen temas de sostenibilidad medioambiental en sus titulaciones?
 - a. En caso afirmativo, ¿cómo y en qué titulaciones?
 - b. ¿Qué fundamentos/teorías/conceptos/ideas se incluyen?
 - i. ¿Hay componentes que se incluyan en todas las titulaciones?

4. ¿Cómo se tienen en cuenta las diferentes necesidades en términos de competencias (genéricas) de los estudiantes que acceden a empleos verdes / áreas de trabajo de sostenibilidad medioambiental?
 - a. ¿Han realizado algún cambio en su pedagogía/forma de enseñar/enfoque de las competencias en su universidad debido a esto?
 - i. En caso afirmativo, ¿cuáles?
5. ¿Ofrecen oportunidades de desarrollo profesional y formación para sus profesores y demás personal universitario en el ámbito de la sostenibilidad medioambiental o la economía verde?
6. ¿Ofrecen oportunidades para que los estudiantes apliquen sus conocimientos teóricos sobre sostenibilidad medioambiental en el mundo real?
 - a. ¿Qué ofrecen?
7. ¿Realizan actividades en la universidad para reforzar el interés por la sostenibilidad medioambiental y los empleos verdes de todos los estudiantes?
8. ¿Organizan actividades sobre oportunidades de empleos verdes en la Universidad?
 - a. ¿Cuáles?
9. ¿Cómo evalúan sus actividades y progresos en sostenibilidad medioambiental?
 - a. ¿Tienen alguna acreditación o certificación en el ámbito de la sostenibilidad medioambiental?
10. ¿Desea mencionar alguna otra acción que hayan llevado a cabo en su Universidad en relación con los empleos verdes y la sostenibilidad medioambiental?

Grupo de Discusión Estudiantes: Sugerencias de Mejora

Dar Definición de Empleos Verdes: La OIT define los Empleos Verdes como "trabajos decentes que contribuyen a preservar o restaurar el medio ambiente, ya sea en sectores tradicionales como la manufactura y la construcción, o en nuevos sectores verdes emergentes como las energías renovables y la eficiencia energética".

Input Investigador: Puede ser cualquier tipo de empleo (finanzas, agricultura, turismo, transporte, etc.).

1. Por favor, indique su nombre, universidad y titulación actual
2. ¿Está interesado en trabajar en un "empleo verde"? ¿Cómo empezó tu interés por la sostenibilidad medioambiental?
 - a. En su opinión, ¿cómo pueden las universidades reforzar el interés por la sostenibilidad medioambiental y los empleos verdes en todos los estudiantes?
3. Desde tu punto de vista, ¿qué cosas deberían aprender todos los estudiantes en materia de sostenibilidad medioambiental?

- a. ¿Hay conceptos/ideas que deberían incluirse en todas las titulaciones?
4. Mencione algunas competencias (genéricas) que considere necesarias para las personas que deseen concentrarse en la sostenibilidad medioambiental en su ámbito de trabajo.
 - a. ¿Cómo pueden enseñarse estas competencias en las universidades?
5. Cuando piensas en tus profesores, ¿qué preparación deberían recibir para integrar más estos temas/habilidades en su docencia?
6. ¿Qué tipo de ofertas quieres recibir de las universidades para aplicar tus conocimientos sobre sostenibilidad medioambiental en el mundo "real"?
7. ¿Cómo te enteras de las oportunidades laborales o cómo encuentras trabajo normalmente?
8. ¿Qué pueden hacer las universidades para ayudarte a conseguir un "trabajo verde"?
 - a. ¿Qué tipo de programas/ofertas/recursos que podrían ofrecer las universidades te ayudarían?
9. ¿Qué otras cosas desearías de tu universidad para estar mejor preparado para entrar en el mercado de los "empleos verdes"?

Entrevistas Sector Privado: Sugerencias de Mejora

Dar Definición de Empleos Verdes: La OIT define los Empleos Verdes como "trabajos decentes que contribuyen a preservar o restaurar el medio ambiente, ya sea en sectores tradicionales como la manufactura y la construcción, o en nuevos sectores verdes emergentes como las energías renovables y la eficiencia energética".

Input Investigador: Puede ser cualquier tipo de empleo (finanzas, agricultura, turismo, transporte, etc.).

1. Indique su nombre, empresa y profesión actual
2. ¿Cómo comenzó su interés por la sostenibilidad medioambiental?
 - a. En su opinión, ¿cómo pueden las universidades reforzar el interés por la sostenibilidad medioambiental y los empleos verdes en todos los estudiantes?
3. Desde su punto de vista, ¿qué cosas deberían aprender todos los estudiantes en materia de sostenibilidad medioambiental?
 - a. ¿Hay conceptos/ideas que deberían incluirse en todas las titulaciones?
4. Mencione algunas competencias (genéricas) que considere necesarias para los titulados que deseen concentrarse en la sostenibilidad medioambiental en su ámbito de trabajo.

5. Mencione algunas competencias (genéricas) que considere necesarias para los titulados que deseen trabajar en empleos verdes.
 - a. ¿Cómo pueden enseñar estas competencias en las universidades?
6. Pensando en los profesores universitarios, ¿qué preparación deberían recibir para integrar más estos temas/habilidades en su docencia?
7. ¿Qué tipo de ofertas cree que ayudarían a los estudiantes a aplicar sus conocimientos teóricos sobre sostenibilidad medioambiental en el mundo "real"?
8. ¿Cómo da a conocer su trabajo y sus ofertas de empleo a los licenciados? ¿Cómo encuentra titulados cualificados para su empresa?
9. ¿Qué pueden hacer las universidades para poner en contacto a los estudiantes con los "empleos verdes" (en su ámbito)?
 - a. ¿Qué tipo de programas/ofertas/recursos que podrían ofrecer las universidades le ayudarían a conectar con estudiantes cualificados?
10. ¿Qué otras cosas desearía de las universidades para preparar a sus estudiantes a entrar en el mercado de los empleos verdes y en su área de trabajo más concretamente?

Entrevistas con Expert@s Tematicos: Sugerencias de Mejora

1. Indique su nombre, organización y profesión actual
2. En su opinión, ¿cómo pueden las universidades reforzar el interés por la sostenibilidad medioambiental y los empleos verdes en todos los estudiantes?
3. Desde su punto de vista, ¿qué cosas deberían aprender todos los estudiantes en materia de sostenibilidad medioambiental?
 - a. ¿Hay conceptos/ideas que deberían incluirse en todas las titulaciones?
4. Enumere algunas competencias (genéricas) que considere necesarias para los titulados que deseen trabajar en empleos verdes.
 - a. ¿Cómo pueden enseñarse estas habilidades en las universidades?
5. Pensando en los profesores universitarios, ¿qué preparación deberían recibir para integrar más estos temas/habilidades en su docencia?
6. ¿Qué tipo de ofertas cree que ayudarían a los estudiantes a aplicar sus conocimientos teóricos sobre sostenibilidad medioambiental en el mundo "real"?
7. ¿Qué pueden hacer las universidades para poner en contacto a los estudiantes con los "empleos verdes"?
 - a. ¿Qué tipo de programas/ofertas/recursos que podrían ofrecer las universidades ayudarían al sector privado a conectar con estudiantes interesados en trabajar en el sector de los empleos verdes?
8. ¿Qué otras cosas cree que deberían hacer las universidades para preparar a sus estudiantes para entrar en el mercado de los empleos verdes?

9. ¿Cómo considera la situación actual de las universidades en América Latina (y más concretamente en Panamá/Costa Rica) a este respecto?

Estudiantes: Evaluación de la Universidad y Sugerencias de Mejora

Dar Definición de Empleos Verdes: La OIT define los Empleos Verdes como "trabajos decentes que contribuyen a preservar o restaurar el medio ambiente, ya sea en sectores tradicionales como la manufactura y la construcción, o en nuevos sectores verdes emergentes como las energías renovables y la eficiencia energética".

Input Investigador: Puede ser cualquier tipo de empleo (finanzas, agricultura, turismo, transporte, etc.).

La estructura consistirá principalmente en que primero les pregunte qué les gustaría ver/tener en las universidades y después les pregunte qué han recibido realmente en la universidad.

1. Indique su nombre, Universidad y titulación actual
2. ¿Está interesado en trabajar en un "empleo verde"? ¿Cómo empezó tu interés por la sostenibilidad medioambiental?
 - a. En su opinión, ¿cómo pueden las universidades reforzar el interés por la sostenibilidad medioambiental y los empleos verdes en todos los estudiantes?
3. ¿Han aprendido algo sobre la sostenibilidad medioambiental en su universidad? ¿Dónde y cómo?
4. ¿Aprendieron sobre temas de sostenibilidad medioambiental en sus titulaciones?
 - a. En caso afirmativo, ¿cómo?
 - b. ¿Qué fundamentos/teorías/conceptos/ideas incluyeron?
 - i. ¿Saben si hay componentes que se incluyan en todas las titulaciones?
5. Desde tu punto de vista, ¿qué cosas deberían aprender todos los estudiantes en materia de sostenibilidad medioambiental?
 - a. ¿Hay conceptos/ideas que deberían incluirse en todas las titulaciones?
6. Mencione algunas competencias (genéricas) que considere necesarias para las personas que deseen concentrarse en la sostenibilidad medioambiental en su ámbito de trabajo.
 - a. ¿Cómo pueden enseñarse estas competencias en las universidades?
7. ¿Cómo les prepara la Universidad para las diferentes necesidades en términos de competencias (genéricas) a la hora de acceder a empleos verdes / áreas de trabajo de sostenibilidad medioambiental?
 - a. ¿Lo notas en su pedagogía/forma de enseñar/centrarse en competencias concretas?
 - i. En caso afirmativo, ¿cuáles?

8. Cuando piensas en tus profesores, ¿qué preparación deberían recibir para integrar más estos temas/habilidades en su docencia?
9. ¿Sabes si la universidad ofrece oportunidades de desarrollo profesional y formación para sus profesores y demás personal universitario en el ámbito de la sostenibilidad medioambiental o la economía verde?
10. ¿Qué tipo de ofertas quieres recibir de las universidades para aplicar tus conocimientos sobre sostenibilidad medioambiental en el mundo "real"?
11. ¿Han escuchado de oportunidades para que los estudiantes apliquen sus conocimientos teóricos sobre sostenibilidad medioambiental en el mundo real?
 - a. ¿Qué ofertas han visto?
12. ¿Sabes si la universidad realiza actividades para reforzar el interés en la sostenibilidad medioambiental y los empleos verdes para todos los estudiantes?
13. ¿Cómo te enteras de las oportunidades laborales o cómo encuentras trabajo normalmente?
14. ¿Qué pueden hacer las universidades para ayudarte a conseguir un "trabajo verde"?
 - a. ¿Qué tipo de programas/ofertas/recursos que podrían ofrecer las universidades te ayudarían?
15. ¿Han escuchado de actividades sobre oportunidades de empleos verdes que organizó la Universidad?
 - a. ¿Cuáles?
16. ¿Qué otras cosas desearías de tu universidad para estar mejor preparado para entrar en el mercado de los "empleos verdes"?
17. ¿Desea mencionar alguna otra acción que han visto en su Universidad en relación con los empleos verdes y la sostenibilidad medioambiental?

10.5 Appendix 5: Insights into NVIVO Coding and Analysis

The screenshots of the NVIVO software attached below illustrate the different codes used and how case groups were created for the analysis.

Nodes Search Project

Name	Files	References	Created On	Created By	Modified On	Modified By	
Career Resources Students Facilitation		33	110	22/06/2023 22:22	JU	15/07/2023 19:43	JU
Civic Engagement		13	25	22/06/2023 22:20	JU	12/07/2023 23:19	JU
Co-Curricular Activities		28	132	24/06/2023 11:44	JU	15/07/2023 19:34	JU
Communication efforts		11	27	22/06/2023 22:23	JU	12/07/2023 00:28	JU
Community Projects		15	41	22/06/2023 22:21	JU	15/07/2023 19:41	JU
Entrepreneurship		17	36	22/06/2023 22:20	JU	15/07/2023 19:43	JU
Green Skills (Teaching)		31	131	22/06/2023 22:19	JU	15/07/2023 19:39	JU
Holistic Approach		26	58	22/06/2023 22:19	JU	15/07/2023 19:35	JU
Institutional Sustainability Policy		31	182	22/06/2023 22:24	JU	15/07/2023 19:46	JU
Job Search		15	48	24/06/2023 16:42	JU	12/07/2023 23:42	JU
Monitoring Progress		12	34	22/06/2023 22:18	JU	12/07/2023 00:08	JU
Sensitization		30	102	22/06/2023 22:16	JU	15/07/2023 19:23	JU
Stakeholder Involvement		24	72	22/06/2023 22:18	JU	15/07/2023 19:28	JU
Sustainability Concepts		36	239	22/06/2023 22:17	JU	15/07/2023 19:42	JU
Sustainability Interest		20	40	24/06/2023 16:27	JU	12/07/2023 23:35	JU
Teacher Training		35	100	24/06/2023 11:43	JU	15/07/2023 19:45	JU
Teaching Focus		33	143	24/06/2023 11:52	JU	15/07/2023 19:42	JU
Teaching Pedagogy		33	178	24/06/2023 12:07	JU	15/07/2023 19:42	JU
Work Experience		25	47	22/06/2023 22:22	JU	15/07/2023 19:40	JU

Case Classifications Search Project

Name	Created On	Created By	Modified On	Modified By
Case Groups	16/07/2023 14:36	JU	16/07/2023 14:43	JU

Name	Type	Created On	Created By	Modified On	Modified By
Universities	Text	16/07/2023 14:38	JU	21/07/2023 23:18	JU
Students	Text	16/07/2023 14:41	JU	16/07/2023 14:41	JU
Private Sector	Text	16/07/2023 14:42	JU	16/07/2023 14:42	JU
Experts	Text	16/07/2023 14:42	JU	16/07/2023 14:42	JU