tourism and hospitality

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The Value of Skills for a Sustainable Tourism and Hospitality Industry

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Abstract: Skills are one of the main themes in academic and labor environments. Nowadays, digital, green, and social and cultural skills are the key to achieving sustainable practices and sustainable development goals. Therefore, this study aims to characterize the current and future needs of digital, green, and social and cultural skills for the tourism and hospitality sectors. This was a quantitative study, with an online survey applied to students, teachers, and professionals. It was a convenience sample with 150 participants. Data were analyzed statistically with IBM SPSS version 28.0. Our results suggested that students, professionals, and trainers value digital, green, and social and cultural skills. With reference to digital skills, all participants considered themselves having an intermediate or advanced level of proficiency. All the participants considered themselves having an intermediate or advanced level of green skills. Regarding social and cultural skills, all the participants considered themselves having an advanced level of proficiency. Therefore, professionals reported higher levels of proficiency in all skills. In the same way, in the tourism sector, we observed higher proficiency levels of skills. To summarize, educational, sectorial, and entrepreneurial sectors recognize the relevance of digital, green, and social-cultural skills for the tourism and hospitality industry. With these skills, the sector will be more prepared to implement sustainability practices and achieve sustainability goals. Additionally, entrepreneurs should value these skills in professionals, and education institutions should integrate the development of these skills into their curricula.

Keywords: digital skills; green skills; social and cultural skills; hospitality; restaurant; tourism; sustainability

Academic Editor: Brian Garrod

Received: 15 November 2024
Revised: 17 December 2024
Accepted: 14 January 2025
Published: 23 January 2025

Citation: Silva, S., Silva, C., & Oliveira, M. (2025). The Value of Skills for a Sustainable Tourism and Hospitality Industry. *Tourism and Hospitality*, *6*(1), 14. https://doi.org/10.3390/tourhosp6010014

1. Introduction

Following the guidelines and concerns of the European Union, sustainability is a current concern for society as a whole and for all sectors of activity. The tourism industry is no exception, as it involves the temporary use of various resources and the movement of people between regions within a country as well as between countries and continents, giving visitors the impression that their actions have no impact on the environment. This sense of temporality also makes visitors want to use all resources to the fullest. However, as the tourism and hospitality industry grow globally, especially in Portugal, tourists have expressed concern about its impact on the environment and have argued that it is crucial to take action to improve the sector's use of all resources, especially by implementing environmentally friendly practices daily (Sakshi et al., 2020). In this regard, having human

resources with the necessary capabilities to execute sustainable practices in tourism and hotel businesses is becoming more and more important (Osolase et al., 2023).

The challenges of today's world, and the competitiveness of the global market are leading to the emergence of new skills and attitudes needed by workers for the labor market, including in tourism and hospitality, where soft, digital, and environmental skills are particularly important (Basnyat et al., 2022; Modi, 2024; Seyitoğlu et al., 2023). Moreover, the PANTOUR: Pact for Next Tourism Generation Skills Project, a European partnership, has developed a European Skills Profile Report in tourism, which has identified the current situation within the sector in relation to digital, green and social skills, and the projected future skills in those three dimensions needed in 2030 (PANTOUR, 2024).

Learning skills that support green technology and behaviors can help create a more resilient and sustainable world, which requires striking a balance between economic growth and environmental sustainability. Given the rapid pace of digital transformation, developing skills that promote both environmental sustainability and social inclusion is essential. Lifelong learning is crucial considering this rapid digital revolution, not only for digital skills but also for green, social, and cultural skills that promote wellbeing and a sustainable future.

People require continual education and training to develop the green skills required for new sectors and occupations, as well as to adjust to new technology. The tourism and hospitality industry has become totally inseparable from information technology, making the availability of the right digital skills in those companies of the highest relevance. Digitalization and new technologies are redefining jobs and also creating new ones, which requires new competencies and skills (Carlisle et al., 2021a). A thorough approach to expertise development is required, one that not only encourages environmental sustainability and social inclusion but which also provides people with opportunities and which acknowledges the difficulties of the digital era.

Furthermore, the DigComp 2.2 project, a European project that presents "The Digital Competence Framework for Citizens", defines a framework of key skills for future jobs in the digital era, grouped by levels of proficiency (Vuorikari et al., 2022). The goal of this framework is to give an instrument to organizations to measure the level of skill proficiency of their collaborators, as well as identifying the needs of upskilling to maintain competitiveness and achieve the Europe Union standards.

The development of digital, green, social, and cultural skills in the tourism and hospitality sectors is fundamental to achieving sustainability objectives. The development of these intersecting skills is essential for creating a workforce capable of implementing effective, innovative, and contextually relevant solutions to sustainability challenges. By integrating digital, green, social, and cultural skills, organizations and individuals can contribute to a more sustainable future that balances economic growth, environmental stewardship, and social equity. Digital skills have become more relevant in the last 20 years, as technological advancements have impacted different spheres of work and life. Digital skills enable the use of technology and improve overall operational efficiency, allowing individuals and organizations to make informed decisions that contribute to sustainability goals; green skills promote understanding of environmental issues and sustainable practices, such as resource conservation, waste management, and pollution reduction (Gomez, 2021). There are direct repercussions when switching to more environmentally friendly practices to fight climate change. One million jobs will be created by the green transition, but 120 million people will also need to be reskilled and upskilled (SOLAS, 2024). In a complementary way, the knowledge of green practices helps organizations comply with regulatory requirements and positions them competitively in a market increasingly focused on sustainability. Social skills are a crucial component of the tourism sector due to the

socio-cultural nature of travel (Carlisle et al., 2023). These skills foster collaboration and engagement with communities. This is vital for implementing sustainability programs that are accepted and embraced by local populations. These skills facilitate, also, effective communication and conflict resolution among diverse groups, allowing for the negotiation of solutions to sustainability challenges that consider various stakeholders' needs. To support economic possibilities and improve human connections in society, it is vital to have the right human resources, operational frameworks, and good training to boost the successful practice of the social skills needed in these fundamental areas of tourism (Carlisle et al., 2023). Together, social and cultural skills allow empathy and inclusivity, by promoting a complete approach to sustainability that respects cultural diversity and social equity, ensuring that vulnerable populations are considered in sustainability efforts. It also permits understanding and respect of local traditions and practices, which are essential for developing sustainable solutions that are culturally appropriate and effective. Therefore, the goal of this study is to characterize the current and future level of skill proficiency of three skills dimensions for sustainability (digital, green, and social and cultural) making a sectorial analysis of professionals, students, and trainers within the tourism and hospitality industry in Portugal.

1.1. Sustainability in Tourism and Hospitality

The concept of sustainability is usually associated with the three dimensions of economic, environmental, and social development, although the environmental factor is often more favored by businesses considering climate change concerns and policies from governments. Nevertheless, there are two most well-known sustainability models: the triple bottom line (TPL) and the 5Ps of sustainability.

The TPL was created in 1990 by business consultant John Elkington, and from a non-financial view brought a comprehensive view of business economic interactions with all stakeholders, including shareholders, customers, employees, governments, the community, and the general public, instead of the initial preoccupation with the economic performance that was solely measured through profit (Hammer & Pivo, 2017). The purpose of this model is for companies to look less only to the economic impact when they are measuring their initiatives and more to a balanced response encompassing the three pillars: economic, environmental, and social (Singh & Dutt, 2024).

The 5Ps of sustainability was introduced by the United Nations to expand the TPL to other fundamental dimensions of living and taking care of society and the planet. The 5Ps stand for people (society), planet (environment), prosperity (economic), peace, and partnerships (United Nations, 2015). This model was created to help governments, and business, to achieve the 17 sustainable development goals.

Nevertheless, the literature shows that the triple bottom line is still the most prominent model being used by businesses (Singh & Dutt, 2024).

Although sustainability is a topic that has been written about for years, the hospitality and tourism sector is still taking the first steps towards its adoption (Alameeri et al., 2018).

The literature shows that few cases of sustainability adoption in tourism and hospitality sector are applying the TPL model, with focus on the environmental perspective, excluding the other dimensions (Sakshi et al., 2020; Hammer & Pivo, 2017; Singh & Dutt, 2024; Alameeri et al., 2018; Jones et al., 2016; Papallou et al., 2024; Renfors, 2024).

Some studies (e.g., Singh & Dutt, 2024; Alameeri et al., 2018; Srivastava et al., 2023) realized that, frequently, the adopted initiatives are connected to the environmental pillar, such as: energy savings, water conservation, recycling, and reduction of single-use plastic. Singh and Dutt's (2024) study argue that this fact is because of the lack of knowledge of different sustainability initiatives and practices that can be carried out and supported by all

departments. Alameeri et al. (2018) identified the most common sustainability management practices developed in each dimension of the TPL model and also highlighted the lack of knowledge about differentiated sustainability initiatives and practices.

The tourism and hospitality sector has grown to be a significant contributor to the global economy. Because of its current worldwide reach, it has a wide range of negative effects on the environment, society, and economy. To control their effects on the environment, society, and economy, a growing number of the industry's key players have implemented corporate sustainability policies (Kumar, 2024; Guerra-Lombardi et al., 2024).

1.2. Skills for Sustainability

The competitiveness of the hospitality and tourism sector depends heavily on the skills and qualifications of its employees. This need becomes even more pressing when it comes to implementing sustainable initiatives and practices, since they require the commitment and generalized involvement of all stakeholders, management, operational staff, partners, and customers (Carlisle et al., 2021b). Regarding the most valuable skills for sustainability in tourism and hotels, the literature shows that the interest of customers with environmental issues and practices has increased, which means that the staff need to develop their skills and acquire competencies about environmentally friendly practices to best satisfy their customers (Carlisle et al., 2021b). Environmental skills, also called green skills, are strongly related to customer perception of service quality and therefore have a significant impact on the competitiveness and attractiveness of tourism and hotel companies (Perramon et al., 2022). Nevertheless, as well as the usual focus on green skills, there have been identified other important skills needed to be developed to meet sustainability in tourism as advocated by the United Nations, namely, related to digital competencies (Modi, 2024; Livingstone et al., 2023; Santoalha et al., 2021; Tan & Wright, 2022) and innovation skills (Pérez López et al., 2024; Shafieieh et al., 2024), social and cultural skills (Aghion et al., 2024; Eizenberg & Jabareen, 2017; Kiryakova-Dineva et al., 2019; Lamri & Lubart, 2023; Nosratabadi et al., 2023), and critical thinking skills (Papallou et al., 2024; Shafieieh et al., 2024; Boluk et al., 2019; Pratt et al., 2024). Boluk et al. (2019) showed the importance of critical thinking skills and presented a framework to strengthen educational sustainable development goals and empower future decision-makers as Critical Tourism Citizens. Also Pratt et al.'s (2024) study highlighted that developing critical thinking within students is crucial to help them to ensure a more sustainable future for tourism practice.

Furthermore, the UNTWO paper (UNWTO & CEGOS, 2019) about the future of jobs and skills in tourism also revealed that the most impacted skills in the field of working in tourism in the future are going to be digital/IT, customer focus, innovation, and creativity, along with bid data and data analytics. Moreover, life–work balance is the most valuable aspect to workers and students (UNWTO & CEGOS, 2019).

The PANTOUR identified the set of digital, green, and social skills for European destination management organizations, food and beverage businesses, and travel agents and tour operators (PANTOUR, 2024). They concluded that, in the next 10 years, there will be a sustainability focus, and tourists will be both diverse and demanding. This means that there will be an ever-growing need for specialized skills and flexibility in job functions, showing that close collaboration with various stakeholders and an emphasis on staff training will be key to thriving in the future in tourism. Moreover, the European Union is also considering digital-era challenges and it presented the DigComp 2.2 project, defining the key competencies for the jobs of the future, and developed a study about the current and future level of skills proficiency (Vuorikari et al., 2022). Tourism and hospitality sectors are essential to the movement toward a more sustainable future. Environmental,

digital, social, and economic concerns must be recognized, given top priority, and included in sustainability plans by all companies (Moosa & He, 2021).

In this work, a framework of future skills proficiency needed to address the challenges of future jobs was established, which can be used to develop and measure the level of proficiency of organizations' collaborators, as well as to develop a training plan for upskilling in respect of the skills needed.

Therefore, this study analyzes the green, digital, and social and culture skills of professionals, students, and trainers, framed according to the proficiency levels established by the DigComp 2.2.

1.2.1. Green Skills

Green talents, such as those pertaining to resource conservation, pollution prevention, and energy efficiency, are those required to adapt and support environmental sustainability, according to Vona et al. (2015). Green talents are becoming more and more in demand, especially in fields where sustainability and environmental rules have a direct impact. For workers to prosper in a green economy, it is imperative that skill gaps be filled through training programs and laws that give them the green skills they need. "The need to transition towards more environmentally sustainable modes of production and consumption has become an imperative both for developed as well as for developing countries," according to Auktor (2020). The same author asserts that businesses and academic institutions must work together to develop training programs that satisfy the needs of a green economy (Auktor, 2020). To make sure that everyone is ready for the potential and difficulties of a sustainable industrial future, effective policy frameworks, public–private partnerships, and international cooperation are crucial. Vona et al. (2015) endorse the view that to build green skills, training programs must be in line with industry demands and chances for lifelong learning must be made available to stay up-to-date with technological changes. Given the shift toward greater environmental sustainability, there is an increasing need for green skills. Education, legislative assistance, and industry engagement are essential for ensuring that human resources can fulfill the demands of a greener world (Srivastava et al., 2023; Teruel-Serrano & Vinals, 2020).

1.2.2. Digital Skills

To increase efficiency throughout the sustainability spectrum and contribute to sustainable growth, technology and technical innovation are frequently viewed as being extremely crucial.

A broad range of technological skills pertaining to computer hardware, digital devices, software, and applications are included in the category of digital talents. As businesses continue to embrace digital technology to carry out critical work functions, employees can benefit from learning how to use all the digital tools that are used by various industries to communicate, manage, and analyze important data (Santoalha et al., 2021). According to Livingstone et al. (2023), having digital abilities is becoming more and more necessary for people to prosper in the modern world. Gaining these skills can increase social connectivity, employment chances, and academic success. For Nosratabadi et al. (2023), governments should concentrate on policies that support digital literacy, social safety nets, and fair access to digital technology to accomplish these aims. Digital skills are becoming more and more important for leaders to handle the complexity of contemporary businesses and use technology for efficiency and creativity (Gilli et al., 2023). For Santoalha et al. (2021), areas with higher levels of digital skills are better positioned to diversify into green industries given the economy and the region's growth. This is because digital competencies facilitate innovation, adaptation, and the development of green sectors, which are essential for

the region's transition to a more sustainable industry and economic and environmental transformation.

According to Nosratabadi et al. (2023), digitalization has an impact on social sustainability, encompassing elements like inequality, social inclusion, and employment. As digital technologies advance, leaders must continue to study throughout their lives, updating their digital skills and honing their leadership abilities to address new problems (Gilli et al., 2023). Santoalha et al. (2021) assert that relatedness and digital skills are important factors influencing green diversification in European regions. Regions can improve their chances of a prosperous and sustainable future by developing industrial ties and improving digital competencies. In conclusion, the digital revolution presents obstacles to social sustainability even as it presents enormous prospects for social advancement. Targeted policies and tactics that support equity and digital inclusion are needed to address these issues.

1.2.3. Social and Cultural Skills

Social and cultural competencies are the aptitudes or proficiencies needed for social engagement. We need social and cultural skills, like effective communication, tactful language, and empathy, to blend in with the group, land a job, and coexist peacefully. As a result, social skills are behaviors that facilitate interaction and connections with others. Additionally, they involve adjusting to social conventions, which differ depending on the context and society.

It is essential to develop a broad range of skills in a world that is changing rapidly due to the digital revolution. Workers must be able to grow and use their skills, and they must succeed in both their personal and professional lives. As employers search for the ideal fit, they must cultivate and sustain both hard and soft skills to succeed. Herrity (Herrity, 2024) asserts that social skills are applied in spoken, nonverbal, written, and visual communication during daily encounters with other people. Every time they connect with others, people use their social and cultural skills, which enables them to build and maintain successful relationships on both a personal and professional level. Professional knowledge is crucial for job productivity, according to Tankovic et al. (2023) yet technical skills are becoming scarce with respect to fulfilling the demands of today's business climate. Employers now look for soft talents, such as interpersonal abilities, people management, and attitudes that improve interpersonal relationships and corporate efficiency, rather than only specialized hard skills. Aghion et al. (2024) found that skills like teamwork and effective communication play a significant role in contributing to individual wage growth, especially for employees with lower formal qualifications. This highlights the significance of soft skills for professional success. In conclusion, social skills are learned throughout life and are essential for adjusting to different circumstances and contexts. Having strong social skills enables workers to successfully adjust to both their personal and professional lives.

2. Materials and Methods

A theoretical framework was used to develop this study, in which we intended to to characterize the current and future level of skill proficiency of three skills dimensions for sustainability (digital, green, and social and cultural) making a sectorial analysis of professionals, students, and trainers within the tourism and hospitality industry in Portugal.

2.1. Study Design

A quantitative, cross-sectional, descriptive, and correlation study was performed to answer the research question "What should be the proficiency level for digital, green, and social skills in the tourism and hospitality industry?".

Our main objectives are: (1) to characterize the current proficiency level of digital, green, and social skills in tourism and hospitality professionals, (2) to characterize the future proficiency levels of digital, green, and social skills in tourism and hospitality professionals, and (3) to distinguish differences in the value attributed to skills according to the participants' profile (gender, age, academic status, professional experience), professional status (student, trainer, professional), and to the activity sector (tourism, hospitality, restaurant).

2.2. Instrument

An online survey was organized to answer the research question. The questionnaire had 72 questions divided into three sections: current proficiency level, future proficiency level, and sociodemographic characterization. The section's current proficiency level presented a set of digital, green, and social skills and each participant had to describe their actual proficiency level of the skill. The 8-point Likert scale was used, presented in the DigiComp 2.2 report (Carlisle et al., 2021a), since it is a very common scale to assess the proficiency level of skills. The 8-point Likert scale refers to: Foundation level 1; Foundation level 2; Intermediate level 3; Intermediate level 4; Advanced level 5: Advanced level 6; Highly specialized level 7; and Highly specialized level 8 (Vuorikari et al., 2022). The future proficiency level section presented a set of digital, green, and social skills, using the same 8-point Likert scale, where participants had to identify what their proficiency level should be in the future. This is what each participant considers will be required, by the sector, in the future. The skills used in both sections were the skills presented in the PANTOUR study (PANTOUR, 2024). The sociodemographic section had questions about factors such as age, gender, job, activity sector, academic status, marital status, and professional experience.

2.3. Sample

The study population was students, trainers, and professionals in order to have a better comprehension of the current skills of the persons working in the sector (professionals), but we also intend to understand what the future of the professionals of the sector will be (students' and trainers' perspective).

Our sample had 150 participants: 85 students (55.6%), 32 professionals (21.3%), and 33 trainers (22%) with ages between 18 and 24 (n = 83, 55.3%) and 45 and 54 (n = 29, 19.3%) years old. Regarding their gender, 101 were female (67.3%), and 49 were male (32.7%). Most of them were in the hospitality sector (n = 81, 54%), and in the tourism sector (n = 34, 22.7%). Concerning their academic status, 103 (68.5%) had higher education. Most of the participants had professional experience (n = 119, 79.3%).

2.4. Procedure

Our study was disseminated through an institutional email to all the trainers and students of the higher education institution, explaining the objectives of the study and with the link for the online survey. The same email was sent to all the partner organizations asking them to disseminate the email through their professionals. Data were collected between June and July 2024.

A quantitative analysis was conducted using IBM SPSS version 28.0. Descriptive measures were performed for every variable. To distinguish differences in the value attributed to skills according to the participants' profile (gender, age, academic status), professional status (student, trainer, professional), and activity sector (tourism, hospitality,

restaurant), Kruskal–Wallis tests were performed. To analyze the differences according to professional experience and gender, Mann–Whitney tests were performed. The significance level used was 95%. All ethical procedures were considered in this study.

3. Results

Our results showed that all skills are valued differently according to the type of skill considered and the participant's profile. Following this section appear the main descriptions and inferential results.

3.1. Current Proficiency Level of Skills

Table 1 shows the mean and median of the current proficiency level of digital skills for all participants. We can observe that the lower current proficiency level is for web and app development and programming for the trainers and professionals. Students considered themselves to have lower proficiency levels in the skill "Use of robots". On the other hand, students and trainers considered themselves to have higher proficiency levels in the skill "Use of office applications". Professionals considered themselves to have higher proficiency levels in the skill of "Secure information processing".

Table 1. Mean and median of the current proficiency level of digital skills of students, trainers, and professionals.

Current Proficiency Level of Digital Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Secure information processing	4.65	5	5.24	5	5.18	5
Use of office applications	5.51	5	6.22	6	5.16	6
Use of digital marketing systems and communications platforms	4.66	5	4.87	4	4.45	5
Digital privacy and ethics	4.72	5	4.97	5	4.85	5
Digital business analysis, business intelligence, data-driven decision-making	4.14	4	4.47	4	4.21	4
Use of robots	3.25	3	3.41	3	2.82	3
Use of digital technologies to create guest experiences	4.40	4	4.47	3	3.45	5
Use of generative AI applications	4.34	4	4.00	3	3.27	4
Web and app development and programming	3.52	3	3.44	3	2.42	3

Table 2 shows the mean and median proficiency level of green skills for all participants. Students referred to a lower proficiency level in the skill of "Green procurement and greening the supply chains", trainers in the skill of "Measurement and management of CO_2 emissions", and professionals in the skill of "Green procurement and greening the supply chains". Regarding the highest proficiency level, trainers and professionals referred to an advanced level of "Efficient use of resources". In the same way, students also valued this skill but at an intermediate level.

Table 2. Mean and median of the current proficiency level of green skills of students, trainers, and professionals.

Current Proficiency Level of Green Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Efficient use of resources (e.g., energy, water, materials)	4.98	5	6.09	6	5.58	7
Promotion and encouragement of sustainable practices among guests	4.75	5	5.84	6	5.53	6
Understanding of environmental laws and regulations	4.13	4	5.25	4	4.30	5
Communication about the organization's efforts towards a green economy	4.22	4	5.41	5	4.58	6
Measurement and management of waste	3.89	4	4.78	4	3.79	5
Measurement and management of CO_2 emissions	3.66	4	4.12	4	2.84	4
Adoption of environmental certifications and management systems	3.65	4	4.78	4	3.09	5
Green procurement and greening the supply chains	3.55	4	4.16	4	2.70	4
Green marketing and product development	3.87	4	4.53	4	3.27	5
Use of technology to speed up the green transition	3.79	4	4.50	4	3.67	4

The results of the current proficiency level of social and cultural skills are presented in Table 3. In this set of skills, we can observe higher mean rates. The skill with higher mean scores was "Support diversity, equality, and inclusivity". Students and professionals referred to an advanced proficiency level and trainers referred to a highly specialized level.

Table 3. Mean and median of the current proficiency level of social and cultural skills of students, trainers, and professionals.

Current Proficiency Level of Social and Cultural Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Provide excellent customer service	5.88	6	7.06	7	6.06	7
Communicate and interact with people from different cultural and social backgrounds	5.85	6	6.91	7	6.39	7
Support diversity, equality, and inclusivity	6.18	6	7.09	7	6.64	7
Communicate effectively with guests and colleagues	6.05	6	6.84	7	6.42	7
Adaptability to change and handle unexpected situations	5.81	6	6.91	7	6.33	7
Communicate effectively with guests in their native language	5.80	6	6.41	7	6.33	7
Resolve conflicts	5.52	6	6.53	6	6.24	7
Understand the cultural setting of the own destination and share this information with guests	5.60	6	6.50	6	6.00	7
Work effectively in a team	6.15	6	6.84	7	6.33	7
Analytical skills	5.46	6	6.47	7	5.88	7
Critical thinking	5.93	6	6.72	7	6.48	7
Learning-oriented	6.01	6	6.91	7	6.45	7
Foreign languages	5.44	6	6.09	6	5.82	6

3.2. Future Proficiency Level of Skills

Regarding the future proficiency level required for the profession, we can observe in Table 4 the mean and median rates for digital skills. All the participants considered the need for an advanced level of digital skills. The skill with higher levels of proficiency reported is the "Use of office applications".

Table 4. Mean and median of the future proficiency level of digital skills of students, trainers, and professionals.

Future Proficiency Level of Digital Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Secure information processing	5.89	6	6.19	7	6.18	7
Use of office applications	6.21	6	6.75	7	6.24	7
Use of digital marketing systems and communications platforms	5.94	6	5.87	6	5.67	6
Digital privacy and ethics	6.06	6	6.25	6	6.09	6
Digital business analysis, business intelligence, data-driven decision-making	5.95	6	6.25	6	5.33	7
Use of robots	5.11	5	5.31	5	4.52	6
Use of digital technologies to create guest experiences	5.88	6	6.03	6	5.42	6
Use of generative AI applications	5.59	6	5.72	6	5.24	6
Web and app development and programming	5.35	5	5.69	5	4.55	6

Regarding green skills (Table 5), all the participants valued their future proficiency needs at an advanced level. The skill with higher mean rates for students and professionals was "Promotion and encouragement of sustainable practices among guests". Trainers referred to a higher proficiency level for "Efficient use of resources".

Table 5. Mean and median of the future proficiency level of green skills of students, trainers, and professionals.

Future Proficiency Level of Green Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Efficient use of resources (e.g., energy, water, materials)	6.07	6	6.75	7	6.39	7
Promotion and encouragement of sustainable practices among guests	6.06	6	6.59	7	6.55	7
Understanding of environmental laws and regulations	5.81	6	6.56	6	6.03	7
Communication about the organization's efforts towards a green economy	5.87	6	6.41	7	6.21	7
Measurement and management of waste	5.72	6	6.18	6	5.27	7
Measurement and management of CO_2 emissions	5.51	6	5.88	6	5.12	6
Adoption of environmental certifications and management systems	5.75	6	6.19	6	5.36	7
Green procurement and greening the supply chains	5.72	6	5.88	6	5.30	6
Green marketing and product development	5.80	6	6.16	6	5.52	6
Use of technology to speed up the green transition	5.82	6	6.28	6	5.82	7

Table 6 presents the future proficiency needs of social and cultural skills. Trainers considered that all the skills will require a highly specialized level, but students considered the need for an advanced level of all the social and cultural skills. Professionals considered the need for a highly specialized level for most skills. Only the skills "Provide excellent customer service", "Communicate effectively with guests in their native language", "Analytical skills", and "Foreign languages" were considered at an advanced level.

Table 6. Mean and median of the future proficiency level of social and cultural skills of students, trainers, and professionals.

Future Proficiency Level of Social and Cultural Skills	Students		Trainers		Professionals	
	Mean	Median	Mean	Median	Mean	Median
Provide excellent customer service	6.95	8	7.56	7	6.97	8
Communicate and interact with people from different cultural and social backgrounds	6.80	8	7.56	8	7.03	8
Support diversity, equality, and inclusivity	6.80	8	7.53	8	7.15	8
Communicate effectively with guests and colleagues	6.85	8	7.50	8	7.24	8
Adaptability to change and handle unexpected situations	6.80	8	7.50	8	7.21	8
Communicate effectively with guests in their native language	6.76	7	7.00	7	6.94	8
Resolve conflicts	6.80	7	7.44	7	7.15	8
Understand the cultural setting of the own destination and share this information with guests	6.68	7	7.31	8	7.00	8
Work effectively in a team	6.95	8	7.41	7	7.18	8
Analytical skills	6.72	7	7.22	7	6.82	8
Critical thinking	6.72	7	7.38	7	7.15	8
Learning-oriented	6.76	7	7.44	7	7.21	8
Foreign languages	6.72	7	7.00	7	6.67	8

To distinguish differences in the value attributed to skills according to the participants' profile (gender, age, academic status), professional status (student, trainer, professional), and to the activity sector (tourism, hospitality, restaurant) several statistical tests were performed. Below, we present the significant differences found.

3.3. Differences in Skills by Participants' Profile

For the participants' profiles, we considered the variables of gender, age, academic status, and professional experience. To analyze possible differences in the current and future proficiency levels of digital, green, and social and cultural skills, several Mann–Whitney tests were performed. We did not find significant differences in proficiency level according to gender.

Regarding the differences in the current and future proficiency levels according to age and academic status, several Kruskal–Wallis tests were performed. We did not find significant differences in the proficiency level of any digital, green, or social and cultural skill.

Considering the dissimilarity of the current and future proficiency levels according to having or not having professional experience, several Mann–Whitney tests were performed. We did not find significant differences in the proficiency level of any digital, green, or social and cultural skill.

3.4. Differences in Skills by Professional Status

Regarding the differences in the current and future proficiency levels required according to the professional status, several Kruskal–Wallis tests were performed. We found significant differences between groups for the current digital skills "Use of digital technologies to create guest experiences" ($p = 0.031$, H = 6.966), "Use of generative AI applications" ($p = 0.049$, H = 6.023), and "Web & app development & programming" ($p = 0.010$, H = 9.288). Professionals reported higher mean levels of "Use of digital technologies to create guest experiences" (mean = 82.36). On the other hand, students reported higher levels of "Use of generative AI applications" (mean = 81.64) and "Web & app development & programming" (mean = 82.18).

For the current proficiency level of green skills, we observed statistical differences for the skills "Efficient use of resources" ($p = 0.006$, H = 10.278), "Promotion and encouragement of sustainable practices among guests" ($p = 0.009$, H = 9.321), "Understanding of environmental laws and regulations" ($p = 0.018$, H = 7.983), "Communication about the organization's efforts towards a green economy" ($p = 0.013$, H = 8.647), and "Adoption of environmental certifications and management systems" ($p = 0.016$, H = 8.258). Professionals reported higher mean levels for all green skills ("Efficient use of resources" mean = 94.67, "Promotion and encouragement of sustainable practices among guests" mean = 92.19, "Understanding of environmental laws and regulations" mean = 94.33, "Communication about the organization's efforts towards a green economy" mean = 94.27, and "Adoption of environmental certifications and management systems" mean = 96.13).

For social and cultural skills, we found significant differences in the skills "Provide excellent customer service" ($p = 0.001$, H = 15.470), "Communicate and interact with people from different cultural and social backgrounds" ($p = 0.001$, H = 13.311), "Support diversity, equality and inclusivity" ($p = 0.010$, H = 9.306), "Adaptability to change and handle unexpected situations" ($p = 0.003$, H = 11.593), "Resolve conflicts" ($p = 0.004$, H = 11.129), "Understand the cultural setting of the own destination and share this information with guests" ($p = 0.023$, H = 7.582), "Analytical skills" ($p = 0.015$, H = 8.383), and "Learning-oriented" ($p = 0.009$, H = 9.311). Professionals referred to a higher mean proficiency level for all the social and cultural skills ("Provide excellent customer service" mean = 100.31, "Communicate and interact with people from different cultural and social backgrounds" mean = 96.77, "Support diversity, equality and inclusivity" mean = 93.63, "Adaptability to change and handle unexpected situations" mean = 95.36, "Resolve conflicts" mean = 92.28, "Understand the cultural setting of the own destination and share this information with guests" mean = 92.27, "Analytical skills" mean = 92.48, and Learning-oriented mean = 91.95).

Regarding future proficiency levels of digital, green, and social and cultural skills, we observed no significant differences according to professional status.

3.5. Differences in Skills by Activity Sector

Regarding the differences in the current and future proficiency levels required according to the activity sector, several Kruskal–Wallis tests were performed. We found no significant differences between groups regarding current digital skills. For the current proficiency level of green skills, we found significant differences in the skills "Efficient use of resources" ($p = 0.029$, H = 9.034), "Measurement and management of CO_2 emissions" ($p = 0.002$, H = 14.908), "Adoption of environmental certifications and management systems" ($p = 0.001$, H = 15.980), "Green procurement and greening the supply chains" ($p = 0.001$, H = 17.071), "Green marketing and product development" ($p = 0.001$, H = 15.521), and "Use of technology to speed up the green transition" ($p = 0.028$, H = 9.067). We observed higher means of proficiency levels in the tourism sector ("Efficient use of resources" mean = 88.53, "Measurement and management of CO_2 emissions" mean = 86.75,

"Adoption of environmental certifications and management systems" mean = 90.57, "Green procurement and greening the supply chains" mean = 87.60, "Green marketing and product development" mean = 93.74, and "Use of technology to speed up the green" transition mean = 92.49).

For social and cultural skills, we found significant differences according to the activity in the skills: "Communicate and interact with people from different cultural and social backgrounds" (p = 0.019, H = 9.958), "Communicate effectively with guests and colleagues" (p = 0.010, H = 11.384), "Communicate effectively with guests in their native language" (p = 0.001, H = 16.190), "Resolve conflicts" (p = 0.009, H = 11.610), "Analytical skills" (p = 0.001, H = 18.124), "Critical thinking" (p = 0.010, H = 11.347), "Learning-orientated" (p = 0.008, 11.957), and "Foreign languages" (p = 0.002, H = 14.620). We found higher mean of proficiency level for the tourism sector ("Communicate and interact with people from different cultural and social backgrounds" mean = 83.10, "Communicate effectively with guests and colleagues" mean = 85.03, "Communicate effectively with guests in their native language" mean = 95.03, "Resolve conflicts" mean = 90.24, "Analytical skills" mean = 94.71, "Critical thinking" mean = 93.26, "Learning-orientated" mean = 92.24, "Foreign languages" mean = 91.16).

Regarding future proficiency levels of digital, green, and social and cultural skills, we observed no significant differences according to the activity sector.

4. Discussion

The results of this study show the perceived level of proficiency in the skills already acquired by students, professionals, and trainers for carrying out sustainable activities in the digital, environmental, and social dimensions, as well as their perception of the level of proficiency they still need to improve. In line with the literature and the digital skills needs identified by the European Union (e.g., Santoalha et al., 2021; UNESCO, 2024; UNWTO & CEGOS, 2019), the level of proficiency in digital skills still needs to be improved. In the case of students, the lowest levels of proficiency are in skills related to robotics, intelligent systems, data analysis, and web programming, indicating a lack of these skills in the curricula of hospitality and tourism courses, and the need to revise curricula with the digital age has already been identified in the literature (e.g., Srivastava et al., 2023; Shafieieh et al., 2024; Teruel-Serrano & Vinals, 2020). Professionals also have lower levels of proficiency in these skills, even lower than students, which demonstrates the need to upskill them, as mentioned in the report on the European Union's DigComp 2.2 project. The most needed skills are the ones related to new technologies, like robotics, intelligent systems, data analysis, and web programming (Vuorikari et al., 2022). It should be noted that, in line with this need for digital skills, across all types of participants, the skill relating to the use of technology to accelerate the ecological transition is the one in which almost everyone had the lowest level of proficiency.

Furthermore, all the participants considered the need for an advanced level of digital skills in the future. Also in relation to future skills, all the participants identified as the highest level of digital skill needed the use of office applications, which is not in accordance with the literature and European projects that identified skills related to data analysis, robotics, web programming, business intelligence systems, and artificial intelligence (Modi, 2024; PANTOUR, 2024; Santoalha et al., 2021; Shafieieh et al., 2024; Tan & Wright, 2022; UNESCO, 2024; United Nations, 2015; UNWTO & CEGOS, 2019).

Regarding green skills, the highest proficiency level for all types of participants was the efficient use of resources (e.g., energy, water, materials) and the promotion and encouragement of sustainable practices among guests, confirming the tendency shown in the literature to focus on the environmental issues related to reducing energy, water and waste

consumption (Papallou et al., 2024; Alameeri et al., 2018) and the concern with service quality and communicating sustainability initiatives to customers (Perramon et al., 2022). The lowest green skill level of proficiency of students and professionals was developing activities related to eco-friendly suppliers and supply chains. The literature shows that concerns with using local suppliers is growing, as is eco-friendly practices adoption (Osolase et al., 2023; López-Gamero et al., 2024). In regard to the perception of participants about their future level of proficiency in green skills, they all referred to valuing these skills considerably since they identified needing an advanced level in all of them in the future, which, as mentioned above, goes in line with the focus in the literature.

In social and cultural skills, the highest level of proficiency was the concern with support diversity, equality, and inclusivity for students and professionals, confirming Basnyat et al.'s (2022) study. The perception of all types of participants was to have a high level of proficiency in the skill "critical thinking"; moreover, the study of Shafieieh et al. (2024) shows the importance of this competency to implement sustainable tourism activities and the need of this skill. For future proficiency levels in social and cultural skills, the trainers identified the need for a highly specialized level in all the skills. Professionals also considered this level of proficiency in almost all the skills, and students considered the need for an advanced level in these types of skills. The literature is unanimous in considering social skills to be very important (Eizenberg & Jabareen, 2017; Kiryakova-Dineva et al., 2019; Nosratabadi et al., 2023). Several studies (e.g., Srivastava et al., 2023; Boluk et al., 2019; Teruel-Serrano & Vinals, 2020; Berjozkina & Melanthiou, 2021; Fernández-Villarán et al., 2024) have highlighted the importance of critical thinking and soft skills in tourism curricula to better prepare students for the challenges of the labor market, namely, to address the issues of sustainability and applying green practices in their daily work.

Considering the differences in the value attributed to skills according to the participants' profile (gender, age, academic status), no significant differences were found in the actual or future proficiency level of any digital, green, or social and cultural skill. Also, in the literature, no study considering these variables was found.

In respect of professional status (student, trainer, professional), this study shows some differences in digital skills proficiency, where professionals are more focused on customers, since the higher level of digital skills comprises the use of digital technologies to create guest experiences. On the other hand, students reported being more focused on tendencies and new technologies, such as artificial intelligence and web and app programming. Regarding the proficiency level of green skills, it worth noticing that professionals were the ones that presented higher differences, with a high level of proficiency needed, which is justified with the focus of business and projects on environmental practices and eco-friendly initiatives already mentioned. For social and cultural skills, professionals referred to a higher mean proficiency level for all skills. This result can be justified by the job experience and difficulties fulfilled in day-to-day work, resulting in professionals valuing soft skills more than the other type of participants.

Regarding the activity sector, there was no difference in the digital skills proficiency level between the sectors of tourism, hospitality, and restaurants. Nevertheless, in green and social and cultural skills there were higher concerns with the proficiency level in the sector of tourism of the same skills identified by professionals. Also, in the literature, there are more studies about sustainable tourism initiatives than in the other sectors of hospitality and restaurants (e.g., Renfors, 2024; Carlisle et al., 2021b; Livingstone et al., 2023; Kiryakova-Dineva et al., 2019; Nosratabadi et al., 2023; Auktor, 2020; Haloui et al., 2024). However, hospitality is a sector already with some studies and projects being carried out with concern about sustainability (e.g., Singh & Dutt, 2024; Alameeri et al., 2018; Perramon

et al., 2022; Tan & Wright, 2022; Pérez López et al., 2024) and more related to green skills, despite not being highlighted in this study.

5. Conclusions

This study emphasizes the critical need for sustainable practices within the tourism and hospitality sector, particularly in alignment with European Union guidelines that stress environmental, social, and economic sustainability. As the industry grows, especially in countries like Portugal, it faces the dual challenge of meeting consumer demands for eco-friendly practices and adapting to rapid technological changes. Key to addressing these challenges are three essential skill sets: green, digital, social and cultural, that not only enhance the quality of services provided but also drive the long-term viability of the sector. Hospitality managers should prioritize developing digital and green skills to enhance efficiency and responsiveness to environmental challenges.

Giving hospitality managers sustainability abilities, especially digital and green skills, can enable them to use digital tools to improve responsiveness and efficiency while efficiently responding to environmental needs. Continuous education in these areas is essential for empowering workers and leaders to embrace sustainable practices in an increasingly digital landscape. To ensure that workers and industry leaders are equipped to adopt eco-friendly practices and adjust to a world that is becoming more digitally connected, lifelong learning, especially in the areas of digital and green competencies, becomes vital. Likewise, building collaborations between government, business, and academic institutions is essential to creating a workforce prepared to handle the demands of sustainable tourism, promoting economic expansion, and attaining social inclusion. This underlines the value of ongoing, focused training in preparing tourism workers to lead and innovate in a field that is becoming more and more focused on sustainability. The findings indicate that proficiency levels for these skills sets are not only varied across participant profiles but also reflect sector-specific needs and expectations for future competencies. For digital skills, there is a growing need across all roles to achieve advanced proficiency, particularly in office applications, data-driven decision-making, and secure information processing, emphasizing the importance of technological fluency in modern workplaces. Green skills, such as efficient resource use and sustainable practices, were also well-valued, reflecting the industry's move towards greener practices as both a social responsibility and a customer expectation. Social and cultural skills, particularly in areas of inclusivity, communication, and adaptability, were valued highly by participants, with a notable emphasis on the ability to communicate effectively across diverse cultural backgrounds, an essential competency in tourism and hospitality. Professionals demonstrated higher levels of proficiency in current social skills, indicating that these skills are improved through real-world experience. The results found accentuate that digital, green, and social skills collectively form an essential skill framework for success in tourism and hospitality, which must be incorporated into any management strategy aimed at sustainability.

Collaborative efforts and partnerships are crucial for building strong collaborations between government, industry, and educational institutions capable of supporting sustainable tourism initiatives. Training initiatives should be adapted to the sector's needs and reflect the specific requests and expectations of the different roles within the sector, particularly regarding digital skills (data-driven decision-making, secure information processing) and green skills (efficient resource use).

This study has some limitations that should be considered, namely, the small number of participants in the subgroup of professionals and trainers. Additionally, some difficulties may have arisen concerning the Likert scale used to classify the level of proficiency, as an 8-point scale can make it difficult for participants to choose because it is so broad. Despite

characterizing the level of future proficiency, we know nothing about the reasons and motivations that led participants to classify them in this way.

From this point of view, in future studies, we recommend using qualitative methodologies to understand the reasons and motivations for identifying future needs. Moreover, it would be interesting to obtain the perspectives of company managers as well as what might be the skills needed by political and sectoral decision-makers.

As already stated, this is an exploratory study that identifies that potentially there is a gap in tourism curricula and skills developed by students in academia and by professionals in their lifelong learning. Therefore, this study should continue by extending it to more of the country and by broadening it to other countries. In addition, the cross-cutting nature of all areas of activity in the tourism industry must be further developed. In this exploratory study, the sector of activity of professionals has already been identified, but without analyzing the characteristics of each area. In addition, a longitudinal study should be carried out to understand the impact that awareness of the skills needs of students, professionals, and teachers can have on the evolution and development of their skills.

Author Contributions: Conceptualization, S.S., C.S. and M.O.; Methodology, S.S., C.S. and M.O.; Formal analysis, S.S., C.S. and M.O.; Writing—original draft, S.S., C.S. and M.O.; Writing—review & editing, S.S., C.S. and M.O. All authors have read and agreed to the published version of the manuscript.

Funding: This research was co-funded by European Union, grant number ERASMUS-EDU-2023-PEX-COVE-project no. 101144003.

Institutional Review Board Statement: Ethical review and approval were waived for this study due to The General Data Protection Regulation (https://www.pgdlisboa.pt/leis/lei_mostra_articulado.php?nid=2961&tabela=leis) (accessed on 30 October 2024).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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