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A CASE STUDY OF ESD EDUCATION ACTIVITIES FOCUSING ON GLOBAL UNIVERSITIES

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ABSTRACT
Universities play a crucial role in the realization of the Sustainable Development Goals (SDGs). As the core of knowledge creation and talent cultivation, universities not only promote social progress through research, teaching, campus management, and social impact, but also fulfill multiple functions of social responsibility. Hundreds of millions of people around the world receive general education, professional training, and career development in universities, which makes universities uniquely positioned and widely influential in promoting Education for Sustainable Development (ESD). This study aims to analyze the key role of universities around the world in promoting SDG-oriented education, with a particular focus on how universities can enhance students' knowledge and skills and develop their sustainable development mindset through their teaching and learning services. By synthesizing cases of ESD practices in universities in different regions around the world, this study explores the impact of ESD activities on students' sustainability awareness and competence in diverse educational contexts, in order to promote a comprehensive transformation and integration of universities around the globe as they address the challenges of sustainable development.

Keywords: Education for Sustainable Development (ESD), Sustainable Development Goals (SDGs), Sustainable Design, Social Responsibility, Social Impact

1 INTRODUCTION

The adoption by the United Nations in September 2015 of Transforming Our World: The 2030 Agenda for Sustainable Development marks a major international consensus on the global response to the most pressing challenges [1]. At the heart of the agenda are the 17 Sustainable Development Goals (SDGs) and their sub-goals, which are designed to guide countries in their collective efforts to address key issues by 2030, including eradicating poverty, guaranteeing food security, protecting the planet's environment, combating climate change, and realizing fully inclusive and peaceful societies. These goals encompass complex social, economic and environmental challenges, the realization of which requires a re-examination of socio-economic modes of operation and the way in which human beings interact with nature, with an emphasis on cooperation and systematic operation among various sectors.

In the process of realizing the SDGs, ESD has become a key issue in the field of higher education. The role of universities in promoting ESD is particularly important as the core of knowledge innovation and talent cultivation. However, different regions and types of universities face diverse opportunities and challenges in implementing ESD education, and such differentiated practices and effects need to be systematically analyzed. This study aims to reveal successful implementation models and innovative practices through an in-depth analysis of ESD cases in universities in different regions around the world. By summarizing these experiences and challenges, this study not only expects to provide effective references for other universities to implement ESD education, but also hopes to provide targeted strategic recommendations for policy makers and educational administrators to promote global higher education to better adapt and serve the needs of human social development.

Despite the growing importance of Education for Sustainable Development (ESD) in global higher education, there is still a research gap in terms of systematic case studies of ESD implementation in universities around the world. Currently, most of the relevant studies focus mainly on specific regions or countries and lack comparative analyses across regions and cultures. This limitation of regional studies has resulted in an incomplete understanding of ESD implementation patterns, success factors, and challenges faced in different national and cultural contexts, thus limiting in-depth understanding of its effectiveness and sustainability [2]. This study aims to fill this gap by analysing the practices and

project implementation in ESD education at De Montfort University in the UK, Jaime I University in Spain and Osaka University in Japan, and summarising the successes and challenges they have achieved in implementing ESD education. The study will adopt literature research method, comparative research method and case study method to explore the commonalities and differences in ESD practices among universities in different countries, and provide valuable references and suggestions, aiming to promote the further development and optimisation of ESD globally.

2 EDUCATION FOR SUSTAINABLE DEVELOPMENT (ESD)

2.1 Definition and development process

Education for Sustainable Development (ESD) is an educational philosophy that aims to prepare students to understand and respond to the challenges of sustainable development, with a core focus on promoting an understanding of the complex relationships between society, the economy, and the environment. ESD focuses not only on the transfer of knowledge, but also on the shaping of values, skills, and behaviours, with an emphasis on the development of critical thinking and problem-solving skills to enable students to actively participate in addressing global issues such as climate change, poverty, inequality and resource depletion [3].

The evolution of ESD can be divided into several key stages.In 1992, ESD was formally incorporated into the global agenda at the United Nations Conference on Environment and Development, emphasising the key role of education in achieving sustainable development. Subsequently, the Decade of Education for Sustainable Development Action Plan from 2005 to 2014 further promoted the popularisation of ESD and facilitated the integration of the concept of sustainable development into the education system of various countries.In 2015, the United Nations Sustainable Development Goals (SDGs) were proposed, making ESD an important tools, especially the explicit emphasis on the role of education in goal SDG 4. SDG 4 not only focuses on ensuring inclusive and equitable quality education, but also emphasises that the content of education should encompass all aspects of environmental protection, social equity, and economic sustainability, a series of developments that signify the growing importance of ESD in the global education system, demonstrating its indispensable role in the promotion of sustainable development [4].

Today, ESD is moving towards a more integrated and systemic approach that is no longer limited to environmental issues, but extends to areas such as social and economic development and cultural diversity, emphasising equity and inclusiveness in education [5]. Through these developments, ESD lays a solid foundation for the development of future citizens with a global perspective and a sense of social responsibility.

2.2 Key features and objectives

As an important educational concept for realizing sustainable development, ESD, with its distinctive features and clear objectives, is committed to enhancing students' comprehensive literacy, including deepening their understanding of the environment, enhancing their sense of social responsibility, and honing their practical skills. First of all, interdisciplinarity is a major feature of ESD, which emphasizes the interconnection between different disciplines and promotes students' understanding of complex sustainable development issues from multiple perspectives, including ecological, economic and social. This multifaceted perspective not only enhances students' ability to think systematically, but also enables them to synthesize and apply what they have learned [6]. Second, the practical nature of ESD emphasizes the enhancement of learning through hands-on practice. Through participation in projects, internships and community services, students apply what they have learned in real-life situations and enhance their ability to solve real-world problems, thus realizing the effective combination of theory and practice. At the same time, ESD has a global perspective and focuses on global challenges such as climate change, poverty and social inequality, aiming to develop students' global awareness and sense of responsibility. By understanding these issues, students are encouraged to actively participate in international affairs and pay attention to the common destiny of mankind [7].

In terms of specific objectives, ESD is committed to raising students' awareness of sustainable development, enabling them to understand the importance of sustainable development and its far-reaching impact on individuals and society, which lays the foundation for future action.

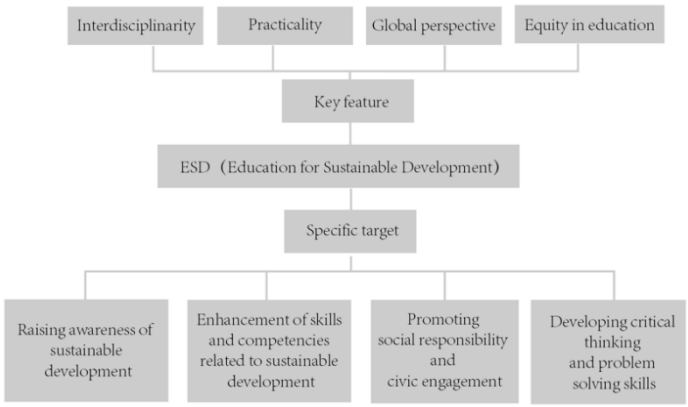

Figure 1. Key features and objectives of ESD

In addition, ESD aims to develop students' critical thinking and problem-solving skills, encouraging them to analyse complex problems in depth and come up with innovative solutions. In this way, students are not only able to identify problems, but also actively search for effective solutions. Further, ESD promotes social responsibility and civic engagement, encouraging students to actively participate in community activities, thus enhancing their impact on society and the environment [8]. Finally, through a diverse range of learning styles, ESD enhances the skills students need in the field of sustainability, including collaboration, communication, leadership, and systems thinking, to ensure that they are able to effectively respond to the challenges of the future.

3 SUSTAINABLE DEVELOPMENT GOALS (SDGS)

3.1 Summary of contents

The Sustainable Development Goals (SDGs), a core component of the 2030 Agenda for Sustainable Development adopted by the United Nations in 2015, comprise a total of 17 goals designed to comprehensively address the complex social, economic, and environmental challenges facing the world. The goals are designed not only to emphasise the importance of addressing immediate issues, but also to focus on long-term sustainability and inclusiveness, aiming to achieve social equity and ecological balance on a global scale [9].

Figure 2. The 17 goals of the SDGs

Specifically, the SDGs cover areas such as eradicating poverty, eradicating hunger, promoting good health and well-being, providing quality education, and achieving gender equality, emphasising the interconnectedness of the different goals. For example, the goals of ‘no poverty’ and ‘zero hunger’ highlightthe importance of basic livelihood security to ensure that everyone can enjoy the basic right to survival; while the goals of ‘good health and well-being’ and ‘quality education’ emphasise the interconnectedness of the different goals. The ‘good health and well-being’ and ‘quality education’ goals focus on the enhancement of human capital, emphasising that education and health are key factors in achieving personal and social development.

Looking ahead to 2030, countries must work together to address the growing global challenges and

ensure the implementation of these goals. The key to the successful implementation of the SDGs lies in the establishment of effective co-operation mechanisms to promote cross-border exchanges and resource sharing, especially in the areas of education, technology transfer and financial support. Through such comprehensive cross-border collaboration, the SDGs will provide strong support for building a more just and sustainable future and realising the global vision of sustainable development [10].

3.2 Interconnections between ESD and SDGs

There is a close interconnection between Education for Sustainable Development (ESD) and the Sustainable Development Goals (SDGs), which together contribute to the achievement of SDGs [11]. ESD, as an educational concept that aims to develop the awareness and capacity of individuals and societies for sustainable development, is closely related to several of the SDGs, particularly Goal 4, "Quality Education", which is the core objective of SDG 4, "Ensure inclusive and equitable access to quality education". "Ensure inclusive and equitable quality education and promote opportunities for lifelong learning" [12]. Through the implementation of ESD, universities can more effectively support the realization of SDG4 by helping students to develop a comprehensive understanding of environmental, economic, and social issues, as well as to develop the critical thinking and innovation skills needed to address these issues.

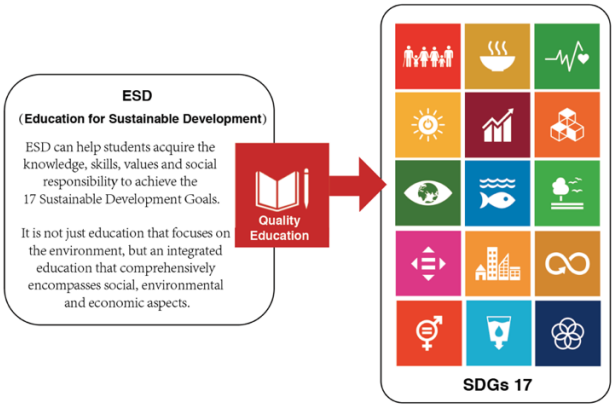

Figure 3. Graphical representation of the correlation between ESD and SDGs

In addition, ESD emphasises the quality and relevance of education, especially in developing students' sense of social responsibility and engagement, which is essential for achieving the SDGs. For example, ESD not only focuses on the transfer of knowledge, but also encourages students to practise in the real world, enhancing their practical abilities in addressing sustainable development challenges. In addition, ESD promotes an interdisciplinary learning model that enables students to explore complex sustainable development issues from multiple perspectives and thus better grasp the requirements of the SDGs. In short, ESD not only provides theoretical support and an educational framework for the realisation of the SDGs, but also lays the foundation for the development of citizens who are aware of and capable of sustainable development. Strengthening the implementation of ESD will have a profound impact on the realisation of the 2030 Agenda for Sustainable Development [13].

4 CASE STUDIES ON ESD IN GLOBAL UNIVERSITIES

4.1 Feasibility analysis

Globally, ESD has become an important research theme in higher education as a core strategy for addressing environmental challenges and promoting socio-economic development. In this study, De Montfort University (UK), Jaume I University (Spain) and Osaka University (Japan) were selected as case studies with the aim of revealing the effectiveness of ESD practices in different regions through empirical analyses. The outstanding achievements of these three universities in their respective regions not only reflect the innovation and effectiveness in the implementation of ESD globally, but also the multidimensional impact of ESD in a number of areas such as curriculum design, educator training, and research practices. Specifically, De Montfort University has been voted the most innovative eco-design university in the United Kingdom and has achieved a 40% increase in the number of collaborative projects through partnerships with Burberry, Stella McCartney and local eco-materials suppliers,

resulting in a closer alignment between course content and industry needs [14]. This case demonstrates how the concept of sustainability can be effectively integrated into higher education curricula through practical projects and industry partnerships, and how ESD can be used innovatively in curriculum design. The 'ImpSDGup' training programme of the Universidad Jaume I has also been very successful in Spain and Europe. Specifically, the course improved educators' SDGs understanding by 60 per cent through regular training seminars and online learning modules, and the results were confirmed through a comparison of pre- and post-test scores [15]. This case demonstrates the effectiveness of ESD in training educators and building support systems, and emphasises the importance of professional development in promoting sustainable education. Osaka University's RISS (Research in Interdisciplinary Sustainable Solutions) programme is widely recognised in Japan and Asia. The programme aims to promote innovative research in the field of sustainability through interdisciplinary collaboration, with the core objective of integrating scientific research with practical applications to address global environmental challenges. The programme's research team has published 15 high-impact scientific papers, such as 'Advancements in Green Technology' in the Journal of Cleaner Production and 'Technology and Innovation' in the Journal of the International Society for the Advancement of Science (ISAS). Technology' in the Journal of Cleaner Production and "Impact of Renewable Energy Innovations" in Environmental Science & Technology, as well as six international research awards [16]. This case highlights the importance of ESD in research innovation and technology application, and shows how the practical application of research results can contribute to the realisation of sustainable development goals. In summary, the achievements of De Montfort University, Jaume I University and Osaka University in their respective regions not only demonstrate the significant impact of ESD practices in the United Kingdom, Spain, and Japan in terms of enhancing curriculum design, educator training and research practices, but also provide sufficient empirical support to validate the validity and representativeness of ESD practices in different regions around the world.

4.2 De Montfort University, UK - ESD innovation in fashion design programme

The UK has demonstrated remarkable characteristics and effectiveness in the field of ESD, and since 2014, ESD has been incorporated into the curriculum of many higher education institutions, forming a clear objective and a relatively well-developed programme structure. Among them, De Montfort University (DMU), as the only UK university recognised by the United Nations as a global centre for the SDGs, actively integrates the 17 SDGs into its teaching, research and university activities, and is committed to placing sustainable development at the heart of the university's work, with the aim of inspiring students to become agents of change in sustainable development concepts in their future careers. The University is committed to placing sustainability at the centre of its work, with the aim of inspiring students to become sustainable change agents in their future careers. Particularly in the field of fashion design, a subject in which De Montfort University has an advantage, the ESD teaching model implemented by De Montfort University is not only innovative, but also provides other higher education institutions with valuable practical experience and templates for ESD [17]. Within the formal curriculum, the discipline adopts two main approaches to the delivery of ESD: firstly, by integrating sustainability modules directly into the professional curriculum, and secondly, by embedding sustainable design projects into the course content. Students are asked to consider sustainability as a core concept in design throughout, beginning with design research, learning and applying sustainable design methods, and guiding the sourcing of materials and the development of design solutions. The course design requires creative structural design using used jeans, prohibits the use of additional fabrics, and encourages group sharing of used clothing remnants to maximise resources. By examining the environmental costs of denim, students gain an in-depth understanding of the pollution of denim fabrics, reflect on cutting waste and waste in commercial production, and enhance their pattern making techniques and fabric utilisation through 'zero waste' strategies, thus acquiring an effective approach to sustainable design and learning to optimise the use of resources and reduce textile waste. Student feedback showed that the implementation of the course resulted in a positive shift in attitudes towards sustainable design and a deeper understanding of sustainability issues in the industry, including the environmental impact of denim fabrics at the dyeing and finishing stages and fabric waste during the design and cutting process. These results demonstrate that university programmes should be centred on sustainability and creativity, and establish an interdisciplinary and industry-engaged problem-oriented teaching and learning environment, so as to achieve harmony and balance among the economy, society and the environment.

4.3 Jaume I University, Spain - 'ImpSDGup' training programme

The 'ImpSDGup' programme launched by the Jaume I University (UJI) in Spain aims to upgrade the skills of higher education teachers in ESD in order to adapt their subject curricula to support the United Nations 2030 Agenda for SDGs. Development Goals. The course is based on the Transformative Action Training Module for Sustainable Development (TMTAS), which provides a theoretical framework for designing and implementing transformative action in ESD [18]. The main objectives of this study are twofold. First, to systematically describe and theoretically justify the design and implementation of the ImpSDGup programme as a teacher training model to guide the effective integration of ESD into university subject curricula; and second, to investigate what ESD transformational measures were implemented in practice by the programme participants in order to assess the effectiveness and impact of the programme in practical application. In the first session, 'From the past to the present', participants will delve into the historical context of unsustainable practices and their impact on today's society. The course will introduce the basic concepts of ESD and help teachers understand their importance. By analysing historical examples and the current situation, teachers will be able to identify gaps in their own teaching, thus laying the foundation for developing students' awareness and competence in sustainable development. In the second session, 'From the present to the future', participants will focus on current concepts and competences in ESD, using the Exercise Y methodology in order to systematically analyse the existing and missing elements of sustainability in their curricula. Y-Exercise is a reflective activity that aims to identify strengths and weaknesses in a programme by guiding participants to make connections between the 'present' and the 'future'. In this process, participants will draw a Y-shaped diagram, with the left side representing the sustainability elements of the current curriculum and the right side depicting the ideal framework for a sustainable curriculum. Through this visualisation, participants are able to gain a clearer understanding of the current state of the curriculum and the direction of improvement [19], which supports subsequent curriculum optimisation. In the third session, 'The Future', participants will evaluate the sustainability performance of the existing curriculum, study successful cases at home and abroad, construct a sustainable curriculum framework that integrates environmental, social and economic balance, and then use the Transformative Action Training Model for Sustainability (TMTAS) to develop specific recommendations for curriculum improvement.

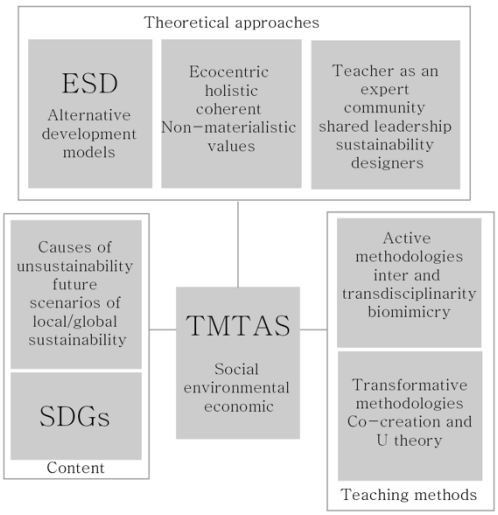

Figure 4. Training Models in Transformative Action for Sustainable Development (TMTAS)

4.4 Osaka University, Japan - RISS sustainability science programme

One of the key challenges facing modern society is the effective use of science and technology to mitigate the negative impacts of human activities on the Earth's life-support systems. To address this challenge, the Research Institute for Sustainability Science (RISS) at Osaka University in Japan has launched an innovative Sustainability Science Programme. Designed through interdisciplinary education, the programme aims to delve into the complex and dynamic interactions between natural systems and human societies. Through this programme, Osaka University has promoted the dissemination and practical application of the concepts of sustainability science, providing important

theoretical and practical support for addressing global sustainability challenges. The programme offers 12 courses, including four core courses and eight sub-courses, covering a wide range of disciplinary areas and research methodologies. As the first comprehensive curriculum system of its kind in Japan, the RISS programme effectively integrates different disciplines and educational networks.

Table 1. Course descriptions in the RISS programme

Course name	Objective
Sustainability valuation methods and techniques	Introduces sustainability assessment methods and uses examples to helpstudents understand the validity and limitations of the theory
Global threatsand sustainability	Explore the causes and consequences of environmental and social change, highlighting the role of interdisciplinary approaches in sustainable development
Society and environment：human security and sustainability	Explore global human security and environmental issues and encouragesolutions through an understanding of the interactions between society and global systems
Engineering systems design for sustainable development	Covers theories of environmental management, eco-design and transport, integrating all three through group projects to propose sustainable solutions

Through these courses, students will not only be able to deepen their understanding of global and social systems, but also acquire practical skills in addressing sustainable development issues. The programmes are designed to develop students' ability to work collaboratively to address sustainable development challenges in a pluralistic context, providing them with a multidisciplinary and cross-cutting learning platform to address complex global environmental and social issues. Osaka University's RISS Sustainability Science Education Programme significantly enhances students' awareness of sustainability through its integrated interdisciplinary and interregional curriculum. The curriculum is designed with a particular emphasis on interaction with different academic and cultural backgrounds, aiming to promote students' ability to integrate the understanding and application of the three dimensions of environment, society and economy. Evaluations have shown that the programme has been effective in enhancing students‘ knowledge and skills in key academic areas, as well as their ability to work collaboratively and practically [20].

5 ANALYSIS OF COMMONALITIES AND DIFFERENCES

5.1 Commonality analysis

When analysing the practices of ESD at De Montfort University (UK), Jaume I University (Spain) and Osaka University (Japan), the notable commonality lies in how these higher education institutions have systematically integrated ESD concepts into their respective disciplines and strengthened their educational effects through practical activities. The ESD implementation strategies of these universities show the following core features: all three universities are committed to embedding ESD concepts into their curricula in order to achieve a seamless connection between educational content and practical application. This common strategies reflect a general trend in ESD practice in higher education globally, which is to enhance the practical applicability and effectiveness of education by integrating theory and practice. This trend not only demonstrates a broad global recognition of the core concepts of ESD, but also provides an effective reference model for universities. Through specific projects and cross-border cooperation, these universities have verified the validity of ESD theory in practice and further promoted the global promotion of ESD [21]. This commonality of practice underscores the systematic and comprehensive nature of ESD implementation, and embodies the common strategies and goals of educational institutions around the globe in the face of the challenges of sustainable development.

5.2 Difference analysis

Despite the existence of common goals and approaches, the practices in the cases also reveal significant differences, mainly in terms of the strategies implemented, subject areas and regional policy contexts. De Montfort University's ESD practice focuses on the field of fashion design, emphasising the close alignment of ESD principles with industry needs. This approach is effective in maximising resources and minimising waste, in line with the European fashion industry's expectation of future designers to practice social responsibility and environmental awareness in their work. Higher education policies in the UK and Europe actively encourage close collaboration between higher education institutions and industry to enhance the employability and industry adaptability of graduates. In particular, the Higher Education Funding Council for England (HEFCE) encourages ESD practice-orientated teaching and industry collaboration in HEIs, which promotes deeper integration between higher education institutions and industry [22]. These policies reflect the unique UK and European support for the ESD concept and the strategic approach, providing important policy contextual support for ESD practice at De Montfort University, thereby significantly enhancing the practical utility of educational outcomes. In contrast, ESD practice at Jaume I University focuses on a systematic training programme designed to enhance the understanding and application of the SDGs. This programme is designed to enhance educators‘ and students’ knowledge of the SDGs and their application to actual teaching and daily practice. In the framework of education policies in Europe, the focus is on the professional empowerment of teachers and the full integration of SDGs. These policies advocate for sound educational support systems and encourage teachers to engage in ongoing professional development and training to enhance their effectiveness in SDGs implementation. Spain's education policies, particularly the Ley de Educación (Spanish Education Law), which articulates the direction of sustainable development in the education system and encourages the integration of SDGs into curriculum design, have provided strong policy support for the training programme at Jaume I University. These policies have not only promoted a deeper understanding and application of ESD among educators, but have also fostered continuous improvement in educational practice [23]. Osaka University's ESD practices, centred on interdisciplinary collaboration, have been particularly effective in projects that apply science and technology to areas such as environmental monitoring and renewable energy, and have won wide recognition internationally. Its Research Institute for Sustainability Science Research Institute (RISS) has introduced an integrated curriculum system comprising 12 courses in which the core and sub-courses together build a platform for interdisciplinary and inter-regional collaboration. This curriculum design not only enhances students' sustainability literacy, but also provides comprehensive theoretical and practical support for addressing global sustainability challenges [24]. The RISS programme at Osaka University promotes the innovation and application of sustainable development technologies through interdisciplinary collaborations that combine academic research with practical problem solving. This model not only highlights the unique strengths of Asian countries in integrating research and practice, but also demonstrates the important role of policy support and integration of research resources, particularly in addressing complex sustainable development challenges [25].

Table 2. Analysis of Commonalities and Differences between DMU, UJI and OU

	Commonality	Difference
DMU	Emphasis is placed on the integration of ESD theory and social practice to enhance students' comprehensive literacy and sense of social responsibility	Explore the realization path of sustainable fashion through ESD innovativedesign concepts
UJI		Emphasize the critical role of educators in the implementation of ESD
OU		Emphasize the development of interdisciplinary competencies and promote the effective integration of science and innovation

5.3 Analysis of conclusions

While ESD practices around the world exhibit many commonalities, successful implementation often relies on localized and individualized strategies. The experiences of De Montfort University, Jaume I

University and Osaka University show that universities need to flexibly adjust their ESD implementation programs according to their own policy contexts, disciplinary characteristics and geographic needs, and that they must take into full consideration the actual needs of the local society and industries, especially in the design of their curricula and the selection of their practice methods. At the same time, higher education policies have a profound impact on the implementation of ESD. Educational policies in the United Kingdom, Spain, and Japan support different ESD practice models, which not only provide educational institutions with the necessary resources and guidance, but also directly influence the design of course content and the effectiveness of implementation [26]. The support of the policy context is one of the key factors in promoting the success of ESD practice. In addition, interdisciplinary collaboration and industry alignment play an important role in enhancing the effectiveness of ESD practice [27]. This is exemplified by De Montfort University's industry alignment model, Jaume I University's systematic teacher training, and Osaka University's interdisciplinary program. Through interdisciplinary and industry collaboration, complex sustainability issues can be effectively addressed and the in-depth application of ESD concepts can be promoted. Future ESD practice should focus more on localized and personalized implementation strategies, while strengthening policy support and interdisciplinary cooperation. Higher education institutions should flexibly adjust their ESD strategies according to their own characteristics and regional needs in order to achieve the educational goals of sustainable development. By continuously innovating and optimizing ESD practices, higher education institutions around the world can better respond to the increasingly complex challenges of sustainable development and make greater contributions to the achievement of the global SDGs.

6 CONCLUSION

Based on these cases, this study recommends that global higher education institutions establish a regionally integrated support framework for implementing ESD. This framework should include the following core components: First, integration within the education system, ensuring that ESD concepts are embedded across all stages of education, from primary to higher education, creating consistent educational goals and methods to enhance overall effectiveness. Second, policy support, advocating for government and educational policies that prioritize ESD and allocate resources, including the development of specific implementation plans, financial support, and incentives. Third, industry collaboration, establishing practice-oriented ESD education programs and internship opportunities through partnerships with local industries and businesses, ensuring that ESD education content aligns with industry needs and enhances practical applicability. Fourth, community engagement, building community partnerships and organizing ESD-based educational activities to promote ESD principles, increase social impact, and foster public support for sustainable development. Finally, a long-term support network and resource-sharing platform should be established to disseminate the latest ESD knowledge and best practices, ensuring the sustainability and long-term effectiveness of implementation. This regionally integrated support framework should not only focus on systematization and comprehensiveness but also fully consider region-specific social and cultural contexts. It aims to provide practical strategies and methods for global higher education institutions to promote and deepen ESD, effectively addressing regional challenges, and facilitating both localized implementation and global integration of ESD. As a future research plan and outlook, this study aims to explore and widely promote the strengths and distinctive features between the environment, society, and ESD across the three universities, further advancing the expansion and development of representative universities globally in the field of ESD education. This study will also explore a systematic expansion plan that leverages cross-regional cooperation and resource sharing to gradually expand the influence of ESD education, ensuring that the global higher education system can widely adopt and implement sustainable development education. The plan will take into account the social, cultural, and economic differences across regions, providing universities with tailored educational models to ensure that ESD education effectively responds to the sustainable development needs of different regions, and actively contributes to the achievement of global sustainable development goals.

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