

Seeking for Effectiveness of Sustainability Entrepreneurial Education

Programs: A Multiple Case Analysis

Fatimata Ly-Baro¹, John M. York², Orsolya Ihasz³

¹Le Mans School of Business, Le Mans University, France

²Institute for the Global Entrepreneur at the Jacobs School of Engineering and the Rady School of Management, University of California (the United States of America)

³Cranfield School of Management, Cranfield University (United Kingdom)

Corresponding Author

Fatimata Ly-Baro, PhD

62 Rue Diderot

78800 Houilles, France

T- + 330770007547

E- fatimalybaro@gmail.com

ORCID ID: NA

Word count: 3298, Tables 3

Fatimata Ly-Baro, PhD: Dr. Fatimata Ly-Baro is a faculty member at Le Mans University in France. She has recently focused on research in sustainable entrepreneurship education and international collaboration.

John M. York, PharmD, MBA, PhDc: Dr. York is a faculty member at the University of California – San Diego (UCSD), Rutgers, and Texas Christian University. He consults with multiple life science startups and has published and presented research on the quick screen in multiple outlets. He is completing his doctorate in leadership and management at Cranfield School of Management.

Orsolya Ihasz, PhD: Orsolya Ihasz is faculty at Cranfield University in the United Kingdom. She focuses on social entrepreneurship and social innovation, consults with early stage startups across Europe, advises governments on building innovation ecosystem.

Seeking for Effectiveness of Sustainability Entrepreneurial Education

Programs: A Multiple Case Analysis

The urgency of environmental challenges necessitates educational programs that equip future entrepreneurs with practical sustainability-specific skills and knowledge. Accordingly, this paper compares sustainability entrepreneurial education program cases using action research at UC San Diego (startBlue and I-CORPS™) and Cranfield University (Ideas-to-Innovation and Energy Entrepreneurship) specific to pedagogical approaches like experiential learning, transdisciplinary collaboration, community mentors, and practical examples.

Findings highlight multiple achievements- underrepresented founder involvement, UN Sustainable Development Goal alignment, and early value development signal identification.

Practically, such insights can guide educators, policymakers, and program designers in enhancing sustainability entrepreneurial education, fostering innovation, and addressing local and regional sustainability challenges through collaboration and practical applications. Also, there are actionable recommendations to facilitate knowledge, skill, and competency development with entrepreneurs, investors, and other stakeholders, thereby aiding sustainability-focused venture development, growth, and success.

Keywords: experiential learning; multi-context program design; sustainability curriculum-oriented; sustainable development goals; sustainable entrepreneurship

Introduction

Sustainable innovations in regions such as rural Africa showcase the transformative potential of fostering such developments while addressing local challenges (Derdabi & Dvoulety, 2024). The need for sustainability competencies via entrepreneurship education enhances business performance in small-to-medium enterprises (Oduro & Matarazzo, 2024). Hence, entrepreneurs and investors need sustainability-specific knowledge to facilitate new ventures that embrace such principles and values (Siefkes, 2024). This orientation aligns with the focus on sustainability entrepreneurial education, which aims to equip future entrepreneurs with the necessary skills and knowledge to drive sustainable business practices.

However, the current progress of the educational dimension of entrepreneurship in the context of sustainability is evolving and continues to be a work in progress. For nearly 35 years, with the 2030 sustainable development agenda, stakeholders expect higher education to play a significant role in contributing to social, economic, and ecological development, which thought leaders define as the triple bottom line (Elkington, 1997). Sustainable Entrepreneurship Education (SEE) is an emerging discipline that combines the principles of Entrepreneurship Education with the direction of Sustainable Development. Research shows that the task is complex. Needed are innovative pedagogies (Lambrechts et al., 2013; Wamsler, 2021), didactics, case studies (Derdabi & Dvoulety, 2024), ecosystem examples (Baldegger et al., 2024), and outcomes of scientific discussions (Sushil, 2018) to serve as inputs and models for fashioning effective programs.

Academic actors are moving in different directions to address the complex challenges. Experiential learning is the most widely used of the many pedagogical approaches, assuming efficacy through reflection and experience (Kolb, 1914) as it offers a platform to address

sustainability by engaging students in projects, value orientation, and self-exploration to enable them to develop creativity and higher skills and act as genuine problem solvers. Further, transdisciplinary collaboration in addressing sustainability challenges is essential to promote experiential learning and mirrors the interdisciplinary nature of SEE programs, which integrate diverse fields to foster comprehensive learning experiences (Robles & Rampersad-Ammons, 2024).

Still, it is not clear whether current SEE program contributions have established clear and defined outcomes, such as learning, behavior and value development outputs. This research explores the following question: What is the relative effectiveness of various entrepreneurial education programs in promoting sustainable business practices and innovation? Specifically, it compares two programs: 1) University of California San Diego's (UCSD) startBlue and I-CORPS™, and 2) Cranfield University's Ideas to Innovation (i2i) and Energy Entrepreneurship.

This work offers two contributions. First, it compares cases from two university programs via an action research approach. Second, it addresses the prevailing research question by sharing outcome data and critical learnings associated with sustainability-oriented education.

This paper starts with a literature review, methods, and case descriptions (characteristics, design, and outcomes). It then discusses essential insights, learnings, and limitations.

1. Theoretical Background on Teaching Sustainability Challenges

Entrepreneurship Education needs to identify the consensual skills and competencies students need to solve sustainability challenges as future entrepreneurs (Mittal &

Raghuvaran, 2021). Competency is a complex interaction of cognitive and behavioral elements (UNESCO, 2017) that involves many teaching approaches. Knowledge is critical to embracing sustainability principles (Siefkes, 2024), and competency is critical to driving real-world success (Oduro & Matarazzo, 2024). There is a need for sharing of best practices among universities (Sharma & Singh, 2020) and more focus on the impact of context elements such as geography and culture (Thomassen et al., 2020; Neergaard & Christensen, 2017). The need to improve sustainability-oriented education frameworks (Biberhoffer et al., 2019; Lans et al., 2014; Ploum et al., 2018) calls for the development of an Integrated Competence Framework for Sustainable Entrepreneurship.

Although higher education institutions offer sustainability-oriented entrepreneurship programs, we have identified three main gaps in the literature. The first gap remains in identifying novel approaches to combining sustainability and entrepreneurship in university programs (Kotla, B.; Bosman, L., 2023). The second gap is concerned with the need for more significant work regarding embedding sustainability, particularly in the business curriculum. (Driscoll et al., 2017; Ferrer-Estévez & Chalmeta 2021; Weybrecht, 2022).

Finally, the literature notices insufficient progress in cultivating sustainability competencies in students and developing personal and professional agency (Alm et al., 2021; Chankseliani & McCowan, 2021) neglected in sustainability education, which can hinder students' development of a comprehensive skill set (Redman et al., 2021). In addressing those gaps, this study uses a multiple-case analysis to investigate the research question- how do different entrepreneurial education programs compare effectiveness for fostering sustainable business practices and innovation? **Integrating** sustainability and

entrepreneurship teaching into a cohesive curriculum can be challenging. There is a need for pedagogical approaches that effectively merge these two areas to enhance student competencies, skills, and mindset for the job market.

2. Data Collection and Multiple Case Analysis

This case comparison examined experiences from advanced university settings such as UCSD and Cranfield University sustainability programs taught from undergraduate to research levels. The multiple-case analysis presents several benefits, particularly in research contexts where understanding the differences between cases is crucial. First, we examined each case individually within its environmental context to identify the unique characteristics and influential factors. Second, a comprehensive comparison across the four experiences unveiled similarities and differences that impact findings. Finally, this evaluation identified current shared trends.

2.1. A Tale of Two University of California, San Diego Programs

The program design and sustainability outcomes are analyzed and compared under contextual conditions.

2.1.1. Contextual conditions and analysis based on program design

The University of California, San Diego (UCSD) exists at the forefront of sustainability education through two distinct programs: startBlue and I-CORPS™. Table 1 compares the two programs' approaches, design, and curricula. startBlue, running from 2021 to 2024, is an accelerator program (six to nine months) managed by the Scripps Institution of Oceanography and the Rady School of Management, focusing on ocean-based sustainability efforts. I-CORPS™, on the other hand, is a short-term boot camp of two to

four weeks (four sessions) offered by the Institute for the Global Entrepreneur at the Jacobs School of Management from 2023 to 2024, with a broader sustainability scope. The curriculum of startBlue is comprehensive, covering customer discovery, market sizing, competition analysis, case studies, and storytelling, with a strong emphasis on practical engagement and customer interviews.

2.1.2. Discussion: Comparative Results in Terms of Program Design and Sustainability Outcomes, along with Insights from Other Efforts in the Literature

A blended learning approach characterizes both programs, combining asynchronous and synchronous activities, including offline videos, readings, assignments, and interviews. This method allows for a more interactive and Socratic in-class experience, whether live or virtual. As noted by Siefkes (2024), programs employed by 'green angels' to develop sustainability-specific knowledge highlight how integration of hybrid learning strategies can prepare students more effectively to navigate complex sustainability challenges. Furthermore, both programs engage mentors, and both involve exercises in class. As highlighted by Robles and Rampersad-Ammons (2024), a transdisciplinary collaboration model in education is critical to experiential learning. Learning by doing and working with seasoned individuals who are entrepreneurs and investors can enhance students' abilities to address multifactorial sustainability challenges. Also, as noted by Derdabi and Dvoulety (2024), educators should contextualize such sustainability education to address regional challenges, fostering innovation and sustainability development. Still, such programs need to be centered and embrace sustainability and green concepts, including green marketing principles, as Oduro and Matarazzo's (2024) meta-analysis found concerning such efforts on SME performance to equip students with the required

skills to drive sustainable business success. Finally, such programs should draw on their ecosystem models but from other successful communities, such as Geneva's (Baldegger et al., 2024), for fostering sustainability in entrepreneurial education in which historical and cultural contexts can facilitate mindsets that prioritize sustainable development.

In addressing this work's overarching research question, startBlue has achieved notable outcomes (Table 2). The most prominent sustainability achievements include the involvement of 50% underrepresented founders and multiple contributions to the United Nations Sustainable Development Goal 14 (Life Below Water). Also notable are early value development signals. Such include both dilutive and non-dilutive investment (\$10.1 million over three years), grants (over \$750,000 from three teams), pitch competition winnings (over \$42,500 from four teams), and venture organization (three teams incorporating, with up to six employees). Furthermore, key learnings emerged from both programs (Table 3). Insights underscore the importance of shifting from a product-centric to a customer and stakeholder-centric focus, recognizing the unique metrics and business models pertinent to sustainability for the future. They advocate for enhanced customer discovery, secondary library research, and practical application to develop core skills for national competition.

In summary, UCSD's startBlue and I-CORPS™ programs exemplify innovative approaches to sustainability education, blending theory with practice and emphasizing customer engagement. Their successes and lessons learned can serve as a model for future sustainability-focused entrepreneurial programs.

2.2. A Tale of Two Cranfield University Programs

Those programs emerge from the focus on the development of an entrepreneurial mindset.

They are explicitly analyzed and then compared.

2.2.1. Contextual conditions and analysis based on entrepreneurial development focus

The Bettany Centre for Entrepreneurship resides at the heart of the School of Management at Cranfield University, focusing on facilitating entrepreneurial growth for small businesses and unlocking the entrepreneurial potential of students across the campus. To provide entrepreneurial opportunities and nurture the entrepreneurial mindset of students from the engineering discipline, the center developed a portfolio of extracurricular non-credit bearing courses such as 'Ideas to Innovation' and the 'Start-Up Weekend'. Incorporating entrepreneurship as a core module into the engineering master-level courses not only helps students to find creative solutions to engineering problems and validate those ideas but also to acquire core business skills, which increases their chances of becoming more employable after completing their studies. The recent Future of Jobs Report highlights creative thinking as one of the top skills for the future, with businesses estimating a 73% increase in demand for this skill. At the Bettany Centre, we have recognized that developing an entrepreneurial mindset and creative thinking is key for scientists and engineers to become highly employable and responsible future leaders.

In this blended learning model, providing students with the opportunity to pitch their sustainability-oriented innovative solutions to a green SEED Fund enables them to develop core competencies, including navigating complex sustainability challenges Siefkes (2024).

'Energy Entrepreneurship' Program

The 'Energy Entrepreneurship module aims to provide students with knowledge and skills relevant to starting and managing new ventures across the entrepreneurial life cycle. Moreover, its design prepares students to transform their engineering knowledge into a business case and learn to prepare a business presentation for a board of investors, either in industry or private investment. The two-week module engages students in various classroom-style lectures, workshops, group discussions, short videos, and case studies. The main task is to design a commercially viable and technologically feasible engineering solution.

ideas-to-innovation (i2i)

The ideas-to-innovation (i2i) program emerged as 'enterprisers' from a collaboration between Cambridge-MIT Institute in 2002 to explore how the entrepreneurial spirit and new innovative methods around entrepreneurship education can drive economic development. This three-day residential program has been designed for second-and third-year PhDs and Early Career Researchers to enhance their professional and personal development. The original aim of the program was to develop self-confidence that enables participants to apply their knowledge and skills to create new ventures or support existing ones through being proactive and innovative. Both industry and academia value the development of business fundamentals and soft skills. i2i allows students to actively engage with the entrepreneurial mindset for a more resilient, resourceful, and solutions-oriented approach toward finding solutions to SDG-type problems. The case analysis juxtaposes program characteristics, key outcomes, and essential learnings in Tables 1, 2, and 3.

Those teaching experiences allow for exploring how entrepreneurship programs influence the development of a sustainability-focused entrepreneurial mindset among engineering students and researchers. By focusing on the curricular and extracurricular activities offered by programs like Cranfield University's Energy Entrepreneurship and Ideas to Innovation (i2i), the study aims to evaluate how these programs help students integrate sustainability into their entrepreneurial thinking and practice and assess the long-term impacts on their career paths and venture development.

2.2.2. Comparative results in terms of focused entrepreneurial mindset development

The program's effectiveness in fostering sustainable business practices and innovation is twofold. First, it lies in the pedagogical approach applied to the programs. Second, placing sustainability at the heart of entrepreneurial value creation results in new entrepreneurial ventures solving SDG-type problems while maximizing value creation for the triple bottom line.

The contribution of both programs lies in the pedagogical approach applied to entrepreneurship education. The two core principles for entrepreneurship education are closely associated with 1) a raised level of performance and 2) unleashed potential and creativity to unlock the can-do attitude. (Vyakarnam & Hartman, 2011). There are two pedagogical approaches to achieving core learning outcomes in entrepreneurship education. Scholars in the community highly regard both 1) education for entrepreneurship and 2) education about entrepreneurship. While education for entrepreneurship focuses on combining two core pedagogical methods, experiential learning (Morris, 2020) and reflective learning, the latter uses the traditional classroom style of delivering information through case studies.

While case studies provide efficient learning outcomes, such as understanding customer needs, value propositions, business models, and succession plans for starting businesses, they rarely bring about the inner drive or instinctive motivation individuals have developed toward their ideas. It is essential to highlight the role of active learning. Such pedagogy is critical to succeed in teaching entrepreneurship, as entrepreneurship is about the idea and all the activities along the entrepreneurial process.

Building a curriculum by providing a concrete experience followed by reflective observation and abstract conceptualization leading to active experimentation could enhance the successful delivery of entrepreneurship education for addressing sustainability-oriented problems. It is essential to highlight the importance of the 'entrepreneurial process' by Carole Moore. Her focus is "making it happen," combined with Jeffry Timmons's work on 'enactment' and the 'entrepreneurial mind' when considering the achievement of success in teaching entrepreneurship. Both curricula support skill and knowledge development that meets the Competence Framework for Sustainable Entrepreneurship. It also places sustainability at the heart of the value creation process by addressing SDG-type problems to build ethical solutions with increased impact on the environment, society, and economy.

3. Comprehensive Cross-Case Analysis and Outcomes

This section compares the four teaching cases. It highlights their similarities and differences, actual trends, and prospective improvements. The lessons learned, outcomes, and limitations raise questions for future research.

3.1 Communalities, Contrasts, and Trends From All Cases

By examining these programs through a comparative lens, this research aimed to highlight the strengths and weaknesses of different educational approaches, ultimately contributing to developing more effective entrepreneurial education initiatives that foster sustainable business practices and innovation.

Customer and market discovery, mentorship guidance, and pitch competitions are the commonalities between all cases. The short-run programs, I-CORPS™ and Ideas to Innovation, encompass all common activities instead of the longer-duration StarBlue and Energy. The actual pedagogical trend and recurring theme are related to the experiential learning approach. Entrepreneurship programs train future entrepreneurs in library research and creative thinking to stimulate their spirit of innovation. The new trend is to gather more data for tracking outcomes and evaluating impact at the economic, social, and environmental levels. Intensifying learning by doing activities will certainly help close the loop by linking pedagogy to practice.

3.2 Contributions and Limitations

This work offers two contributions, mainly to practice. The first is that it provides a comparison analysis of two separate universities' programs related to sustainability. The

second involves addressing the overarching research question around outcomes and achievements, which exist in several of the case descriptions.

As in all research, limits do exist. This work involved action research and drew upon data retrospectively. While it engaged cases for analysis, the methodology did not engage standard case study approaches, such as that of Eisenhardt (1989, 2022), Gioia (2013, 2022), and Langley (2009, 2022). Finally, there was also bias in the researchers' association with the training programs. This consideration is a common element that exists in action research.

3.3 Action and Case Study Research as a Future Perspective

The findings and limitations of our study lead to a few directions for future research. Human communities and organizations expect a global and consensual solution to the triple bottom-line issues. So, collaboration and mutual support from different stockholders is needed. Using Western advanced pedagogical models could allow shortcuts for developing countries to gain momentum in addressing the many sustainability challenges. In addition, Western curricula have been applied for a long time in Africa without any evaluation. It is urgent to do so because educating actual and future generations is vital for individuals, society, businesses, and the global environment. The proposed study will set the foundations of action research-based projects that aim to find ways to draw on and adapt Western sustainability programs to the needs of developing countries. Integrating learnings and best practices from Western sustainability programs into the developing contexts is somewhat challenging. For instance, teaching entrepreneurship in Africa comes with unique challenges and requires the incorporation of local cultures and high-

quality education. International collaboration and knowledge sharing from advanced designed programs will foster a learning environment for sustainable development.

The action research limitations identified set the stage for extending the initial findings into a more extensive and robust approach. Such an effort would utilize a more standardized case study methodology (Eisenhardt, 1989; Gioia, 2013; and Langley, 2009) to construct theory from the data elements. These studies would address specific questions about how such actors can embrace critical elements in developing such programs and how such participants can achieve both sustainability and commercial success.

Conclusion

This research explores the relative effectiveness of various entrepreneurial education programs in promoting sustainable business practices and innovation. The critical metrics for comparison are sustainability-oriented innovations, participant engagement with sustainability goals such as the United Nations Sustainable Development Goals, funding acquisition, and evidence of early value development. Both US programs are refining their approaches and curricula to be consistent with strategy in practice or learning by doing. There needs to be a continued learning-by-doing emphasis, further development of the sustainability curricula, greater customer discovery work (especially for those teams seeking to attend the national I-CORPS™ program), and secondary market research efforts by engaging UCSD's library capabilities and resources. By examining these programs through a comparative lens, this research highlights the strengths and weaknesses of different educational approaches, ultimately contributing to fostering sustainable business practices and innovation.

Sustainability Entrepreneurship is a burgeoning area of research that contributes to the understanding of educational approaches that build on cultural and contextual factors influencing sustainable entrepreneurship in other curricula. The multifaceted experiences can inform the development of similar initiatives for women and young entrepreneurs in other regions, such as Sub-Saharan Africa, similar to the case studies involving sustainability in rural Nigeria and Tanzania (Derdabi & Dvoulety, 2024). While the students represent all geographical regions, they receive education in a Western context, which could cause them to overlook the cultural factors associated with entrepreneurship education in developing countries. Finally, it calls for further research to understand the cultural and contextual factors influencing sustainable entrepreneurship, particularly in developing regions.

References

- Anbarasan, P., & Sushil. (2018). Stakeholder engagement in sustainable enterprise: Evolving a conceptual framework, and a case study of ITC. *Business Strategy and the Environment*, 27(3), 282-299.
- Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian journal of social psychology*, 2(1), 21-41.
- Baldegger, R., ElTarabishy, A., & Alves, J. (2024). Geneva's entrepreneurial ecosystem: From historical roots to a sustainable future. *Journal of the International Council for Small Business*, 1-17.
- Biberhofer, P., Lintner, C., Bernhardt, J., & Rieckmann, M. (2019). Facilitating work performance of sustainability-driven entrepreneurs through higher education: The relevance of competencies, values, worldviews, and opportunities. *The International Journal of Entrepreneurship and Innovation*, 20(1), 21-38.
- Chankseliani, M., & McCowan, T. (2021). Higher education and the sustainable development goals. *Higher Education*, 81(1), 1-8.
- Derdabi, A., & Dvouletý, O. (2024). Sustainable innovations for rural Africa: Case studies from Nigeria and Tanzania. *Journal of the International Council for Small Business*, 1-27.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Elkington, J. (1997). The triple bottom line for 21st-century business. *Journal of Experimental Psychology: General*, 136.
- Ferrer-Estévez, M., & Chalmeta, R. (2021). Integrating sustainable development goals in educational institutions. *The International Journal of Management Education*, 19(2), 100494.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational research methods*, 16(1), 15-31.
- Gioia, D., Corley, K., Eisenhardt, K., Feldman, M., Langley, A., Lê, J., ... & Welch, C. (2022). A curated debate: On using "templates" in qualitative research. *Journal of Management Inquiry*, 31(3), 231-252.
- Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.
- Kotla, B., & Bosman, L. (2023). Redefining Sustainability and Entrepreneurship Teaching. *Trends in Higher Education*, 2(3), 498-513.

- Lambrechts, W., Mulà, I., Ceulemans, K., Molderez, I., & Gaeremynck, V. (2013). The integration of competencies for sustainable development in higher education: an analysis of bachelor programs in management. *Journal of Cleaner Production*, 48, 65-73.
- Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The improvement guide: a practical approach to enhancing organizational performance*. John Wiley & Sons.
- Lans, T., Blok, V., & Wesselink, R. (2014). Learning apart and together: Towards an integrated competence framework for sustainable entrepreneurship in higher education. *Journal of Cleaner Production*, 62, 37-47. <https://doi.org/10.1016/j.jclepro.2013.03.036>
- Michelsen, G., & Wells, P. J. (2017). *A Decade of progress on education for sustainable development: reflections from the UNESCO Chairs Programme*. UNESCO Publishing.
- Mittal, P., & Raghuvaran, S. (2021). Entrepreneurship education and employability skills: The mediating role of e-learning courses. *Entrepreneurship Education*, 4(1), 153-167. <https://doi.org/10.1007/s41959-021-00048-6>
- Moore, C.F., 1986, August. Understanding Entrepreneurial Behavior: A Definition and Model. In *Academy of Management Proceedings* (Vol. 1986, No. 1, pp. 66-70). Briarcliff Manor, NY 10510: Academy of Management.
- Morris, T.H., (2020). Experiential learning—a systematic review and revision of Kolb's model. *Interactive learning environments*, 28(8), pp.1064-1077.
- Neergaard, H., & Christensen, D. R. (2017). Breaking the waves: Routines and rituals in entrepreneurship education. *Industry and Higher Education*, 31(2), 90-100.
- Oduro, S., & Matarazzo, M. (2024). Linking green marketing and SMEs performance: A psychometric meta-analysis. *Journal of Small Business Management*, 1-43.
- Ploum, L., Blok, V., Lans, T., & Omta, O. (2018). Toward a validated competence framework for sustainable entrepreneurship. *Organization & Environment*, 31(2), 113-132.
- Redman, E., Wiek, A., & Barth, M. (2021). Current practice of assessing students' sustainability competencies: A review of tools. *Sustainability Science*, 16(1), 117-135. <https://doi.org/10.1007/s11625-020-00855-1>
- Robles, S., & Rampersad-Ammons, J. (2024). High impact sustainable transdisciplinary collaboration model for food justice. *Journal of the International Council for Small Business*, 5(1), 72-78.
- Sharma, S., Goyal, D. P., & Singh, A. (2021). Systematic review on sustainable entrepreneurship education (SEE): A framework and analysis. *World Journal of Entrepreneurship, Management and Sustainable Development*, 17(3), 372-395.

- Siefkes, M. (2024). A guide to becoming green: Insights from angel investors developing sustainability-specific knowledge. *Journal of Small Business Management*, 1-31.
- Snihur, Y., & Eisenhardt, K. M. (2022). Looking forward, looking back: Strategic organization and the business model concept. *Strategic Organization*, 20(4), 757-770.
- Thomassen, M. L., Williams Middleton, K., Ramsgaard, M. B., Neergaard, H., & Warren, L. (2020). Conceptualizing context in entrepreneurship education: a literature review. *International Journal of Entrepreneurial Behavior & Research*, 26(5), 863-886.
- Vyakarnam, S. and Hartman, N.A., 2011. *Unlocking The Enterpriser Inside! A Book of Why, What, and How!*. World Scientific.
- Wamsler, C., Osberg, G., Osika, W., Herndersson, H., & Mundaca, L. (2021). Linking internal and external transformation for sustainability and climate action: Towards a new research and policy agenda. *Global Environmental Change*, 71, 102373.
- Weybrecht, G. (2022). Business schools are embracing the SDGs–But is it enough? –How business schools are reporting on their engagement in the SDGs. *The International Journal of Management Education*, 20(1), 100589.

Tables

	UCSD		Cranfield	
	startBlue	I-CORPS™ Sustainability	Ideas to Innovation	Energy Entrepreneurship
Coordinating Group	Scripps Institution of Oceanography/ Rady School of Management	Institute for the Global Entrepreneur/Jacobs School of Engineering & Rady School of Management	Bettany Centre for Entrepreneurship, Cranfield University, other UK universities (University of Cambridge)	Bettany Centre for Entrepreneurship, School of Water, Energy and Environment, Cranfield University
Program	6-12 mo accelerator Ocean-based issues/tech	2-4 wk-long bootcamp Sustainability-based issues/tech	3-4-day residential program Deep-tech / Deep-science	2-week module Sustainability-based issues/Renewable energy tech
Timing	2021-24	2023-24	2002-2024 (Cranfield 2016)	2020 - 2024
Cohorts	3- 22 teams (8/year)	2- 22 teams (12/cohort)	over 2000 researchers (42-64/ cohort)	48 teams (12 /module)
Curricula	Evolving: <u>Y1</u> : OKRs, guest lectures, tours, and mentors <u>Y2</u> : Broader topics (market sizing, competition, market opportunity navigator (MON), customer discovery (CD), BMC, storytelling) and guest lectures <u>Y3</u> : C2 and greater engagements	I-CORPS™ based-CD, BMC, MON, sustainability, and storytelling	<u>Day 1</u> : personal values, motivation, and impact pathways <u>Day 2</u> : venture idea, business know-how, market research, value proposition, BMC <u>Day3</u> : communication, impact, storytelling	Classroom-style lectures, workshops, group discussions, short videos, and case study analysis. Finding and exploiting a business opportunity based on a market need, value propositions, business model, and sustainability
Approach	Synchronous/asynchronous Socratic and engaging → CD, in-class exercises, report-outs, office hours, and a final presentation Strategy as Practice → Learn-by-Doing (LBD)		Experiential Learning Socratic and engaging → in-class exercises, final presentations, follow-up investment through SEED Fund Strategy as practice → Learn-by-Doing (LBD), sustainability at the heart of value creation	

Table 1. Program Characteristics

	UCSD		Cranfield
	startBlue	I-CORPS™ Sustainability	
Sustainability	50% underrepresented founders UN SDG goal 14 (1, 2, 5, & A) life underwater NOAA grant submission/support	DATA ARE CURRENTLY NOT AVAILABLE	UN SDG focused on deep tech solutions, improved routes to commercialization, and increased impact pathways. SEED Fund, Green Investment Fund
Funding	Overall: \$10.1 M raised (dilutive, non) Grants: 6 applied, 3 received (\$2,500-\$750,000)	WORK-IN- PROGRESS	Sustainability-oriented innovations to challenges around renewable energy and environment. Sustainability at the heart of value creation SEED Fund, Green Investment Fund
Venture Organization	3 inc and with employees (2-6)		Network of academics, industry experts, entrepreneurs and investors
Other	Pitch competitions. All with 4 getting pitch competition awards (\$1,500-\$42,500), including Triton Challenge & MIT winners		Network of academics, industry experts, entrepreneurs and investors Pitching practice, Investor Day

Table 2. Accomplishments and Outcomes

	UCSD		Cranfield	
	startBlue	I-CORPS™ Sustainability	Ideas to Innovation	Energy Entrepreneurship
Sustainability	More sustainability - areas, opportunities, business models and metrics		Deep tech solutions for SDG-related challenges, sustainability at the heart of value creation	Sustainability-oriented challenges around renewable energy and the environment
Mental Models	Move from tech/product (pitching) → Customer/stakeholder/market		Move from tech/product (pitching) → Customer/stakeholder/market	
Program	Bring in expert and investor panels Expand customer discovery and library research. More learn-by-doing (strategy as practice)	Teams to develop stronger skills and prep for I-CORPS™ National Expand CD & library research. More LBD (in-class exercise time)	Bring in industry experts and entrepreneurs as facilitators and investors for the final panel. Expand customer and market discovery to impact pathways. (research to commercialization) and apply for SEED fund	Teams to unlock the entrepreneurial mindset and develop basic business know-how through 2-weeks to pitch to an expert panel and apply for SEED fund
Monitoring	Better data tracking of outcomes Entrepreneurial cognitions assessments Enhance single-, double-, and triple-loop learning		Better data tracking of outcomes, both number-based (#start-ups to individual career pathway) Entrepreneurial self-efficacy assessments Enhance single-, double-, and triple-loop learning	
Application	Apply clear fundamentals around Sustainability sustainability, CD, customer focus, and LBD to Senegal Allow for enough time in an accelerator setting		Explore various impact pathways for sustainability, customer focus, behaviorally informed, investor readiness	

Table 3. Key Learnings



DSPACE

<https://dspace.org/>

Seeking for effectiveness of sustainability entrepreneurial education programs: a multiple case analysis

Ly-Baro, Fatimata; York, John M.; Ihasz, Orsolya

2025-06

Taylor and Francis

<https://doi.org/10.1080/26437015.2024.2406918>

Ly-Baro F, York JM, Ihasz O. (2025) Seeking for effectiveness of sustainability entrepreneurial education programs: a multiple case analysis. Journal of the International Council for Small Business, Volume 6, Issue 2, June 2025, pp. 297-310