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DESIGNING A CURRICULUM FOR A SUSTAINABLE ENTREPRENEURSHIP MAJOR: A CASE STUDY

(PRACTICE)

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ABSTRACT

This practice paper explores the process of developing a curriculum for a sustainable entrepreneurship major program in a higher education institution. The paper aims to address the need for embedding sustainability and entrepreneurship into higher education, considering global challenges such as climate change, social inequality, and unsustainable consumption and production. The paper fills a gap in the existing body of knowledge by providing a case example of a curriculum development process that can be adapted to integrate sustainable entrepreneurship into curricula at other universities.

The paper outlines a three-part curriculum development process which involves identifying stakeholders and clarifying the program's purpose, determining program-level learning outcomes, and developing courses that align with the program's purpose and intended learning outcomes. The paper's findings emphasize the importance of involving stakeholders (such as faculty members, potential students, alumni, industry professionals and decision-making bodies within the university) in curriculum design. The paper concludes with a discussion on the iterative nature of identifying program-level learning outcomes, the challenges of balancing dual themes from a rapidly changing field of study in the curriculum, and academic resource limitations. A well-designed sustainable entrepreneurship major can benefit students, faculty, business and industry, and society at large by providing the knowledge, skills, and opportunities necessary for socially and environmentally responsible entrepreneurship.

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1 INTRODUCTION

This practise paper explores the author's experiences in developing a curriculum for a sustainable entrepreneurship major program. Sustainable entrepreneurship refers to the “discovery, creation, and exploitation of entrepreneurial opportunities that contribute to sustainability” (Brazdauskas and Žirnelė 2018). The need for integrating sustainability and entrepreneurship into higher education is growing due to global challenges like climate change, social inequality and unsustainable consumption and production (United Nations, 2023). This paper fills a gap in the existing body of knowledge by describing the curriculum development process of a sustainable entrepreneurship major that can be adapted to embed sustainable entrepreneurship into curricula at other universities.

The paper is structured as follows: Section 1.1 discusses the context and scope of this paper, while Section 1.2 delves into the educational theory that informs the curriculum development process described herein. Section 2 discusses the process in three parts: 1) identifying stakeholders and building understanding about the program's purpose, 2) identifying relevant program-level learning outcomes, and 3) developing courses that align with the program’s purpose and intended learning outcomes (ILOs). Section 3 presents findings, and finally, Section 4 contains conclusions, limitations and implications, and an exploration of the broader relevance of the case example discussed in this paper.

1.1 CONTEXT

This paper outlines the process of developing a curriculum for a new sustainable entrepreneurship major at Aalto University in Finland, a public research university with schools in Engineering; Electrical Engineering; Chemical Engineering; Science; Business and Arts, Design and Architecture. The focus is on the design and preparation process of the curriculum, excluding the formal decision-making process of the university, course-level pedagogy and program evaluation. It is important to note that the development of the program is still a work in progress at the time of writing, with the first cohort set to begin their studies in 2024.

The paper contributes to the ongoing academic discussion on how to prepare students to become sustainable entrepreneurs. Research has suggested that sustainable development is increasingly seen as a key mission of HEIs (Alm et al, 2021). Bonnet et al (2006) state that “sustainability, development of personal skills, social aspects of technology and entrepreneurship are of increasing concern for engineers and therefore also for engineering education”. Wiek et al. (2011) have conducted a broad literature review on key competences in sustainability education, concluding that they include systems thinking, anticipatory, normative and strategic competencies combined with interpersonal competence, critical thinking and communication. However, a challenge of embedded sustainability practice in entrepreneurship education is that it is typically limited and regarded as an “add-on” to traditional entrepreneurial teaching (Wyness et al, 2015).

1.2 THEORY

The curriculum development process in this paper is guided by Biggs' principle of constructive alignment. Constructive alignment, originally focused on designing

teaching and learning activities such as courses, can also be applied to larger educational entities like curricula (Biggs 2003). The theory emphazies that that learners construct their own knowledge through relevant activities.

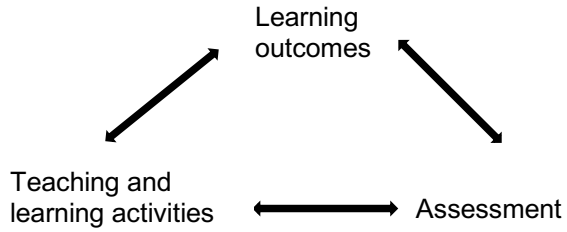

Fig. 1. Constructive alignment (Biggs 1996)

The process of constructive alignment involves aligning ILOs, teaching and learning activities, and assessment tasks. Designing engaging teaching activities and appropriate assessment ensures effective learning and achievement of ILOs. Alignment facilitates students in attaining their desired learning outcomes.

2 METHOD

The curriculum development method used in this paper follows Biggs' principle of constructive alignment. The process consists of three parts: 1) identifying stakeholders and clarifying the program's purpose, 2) determining program-level learning outcomes, and 3) building alignment between purpose and teaching by identifying and developing courses to meet the program's purpose and ILOs. This section provides an overview of the key steps taken to support each stage in the case example.

2.1 Identifying stakeholders and building understanding about the purpose of the program

The curriculum design process involved engaging with 5 different stakeholder groups: 1) faculty members, 2) potential students, 3) alumni from related fields, 4) industry professionals and 5) decision-making bodies within the university. The first group, faculty members from two units from the schools of Science and Business, initiated discussions on co-developing a new major program during a curriculum development course in 2022. Joint meetings with the cooperating units followed, and established a plan of action, roles and responsibilities, program-level ILOs, and a preliminary program structure.

The second group, potential students, provided input through a survey on entrepreneurial mindset and informal discussions during entrepreneurship courses. The survey was sent out to 13,066 students enrolled at the university in November 2022, and received 824 responses (Aalto Ventures Program, 2022). The survey included questions on entrepreneurial mindset, student interest in starting a company, their views on their own entrepreneurial skills and capabilities, and whether they saw solving sustainability-related problems as a motivator to becoming an entrepreneur. The third group, alumni, was represented through data from a third-party graduate survey (Tekniikan Akateemiset, 2022). The survey included data on student's self-reported expertise on entrepreneurial capacities, as well as employment data, which was used to help chart employment prospects after graduation for the proposed

program. The survey was sent out to 2,921 graduates, of whom 1,785 answered. Only the responses from Aalto University graduates, comprising 53% of the total respondents, were used in the curriculum design process.

The fourth group, industry professionals, contributed through discussions conducted in the spring of 2023. Themes included what knowledge and skills the 7 locally influential entrepreneurs had found useful in their own careers as entrepreneurs, and what they would like to see being taught in a sustainable entrepreneurship program in the future. Their input was used to inform the ILOs outlined in the next section. The fifth group, decision-making bodies within the university, were consulted to ensure compliance with regulations and accreditation requirements.

2.2 Identifying program-level ILOs

The process of identifying ILOs involved integrating data from the surveys and stakeholder discussions described in the previous section. The process began with faculty discussions on what courses teaching staff were currently working on, what they would be interested in (and committed to) teaching that is not currently being offered, and how they see the future of the program under development. Subsequently, a series of workshops with teaching staff was conducted to establish development goals, identify potential collaborations, and begin drafting program-level ILOs. At the time of writing, the program-level learning outcomes include the following:

- Understand the principles of entrepreneurship and the systemic nature of social, environmental, and economic sustainability challenges
- Understand how entrepreneurship can impact sustainability challenges and vice versa
- Apply scientific knowledge to critically evaluate the sustainability potential of entrepreneurial opportunities
- Cultivate an entrepreneurial mindset to address sustainability challenges in a variety of managerial settings and roles
- Develop the essential soft and hard business skills to experiment with and create sustainable new ventures

2.3 Building alignment between purpose and teaching

After identifying program-level ILOs, the next step in the curriculum development process was to ensure their alignment with teaching and learning activities. First, we identified existing courses related to entrepreneurship and sustainability already being taught at the two units collaborating on the program. Second, we conducted a search for other suitable multidisciplinary courses on offer using the university's course database. Third, we began discussions with the teachers of these courses regarding their willingness to allow the students of the proposed new program to enroll in their classes. The result was a list of available courses suitable for the program.

The list of suitable existing courses was then mapped against the program-level ILOs (Appendix 1). Thematic color-coding was used to help make the balance between entrepreneurship-related courses and sustainability-related courses easier to visualize. Identified gaps included a theory-based foundations of entrepreneurship course, a startup leadership course, an entrepreneurial financing course, and a capstone course.

Next, the course lists were divided into core content and electives. Core content was divided into three core elements or "pillars" – sustainability, entrepreneurship and "hard skills" such as finance and law, to ensure adequate breadth and depth of knowledge (Figure 1). Electives were divided into two tracks based on graduate career prospects derived from our stakeholder discussions: the sustainable startup track (for those interested in founding or working in a startup), and the sustainable corporate entrepreneurship track (for those wishing to work in the entrepreneurship ecosystem in a non-founder role).

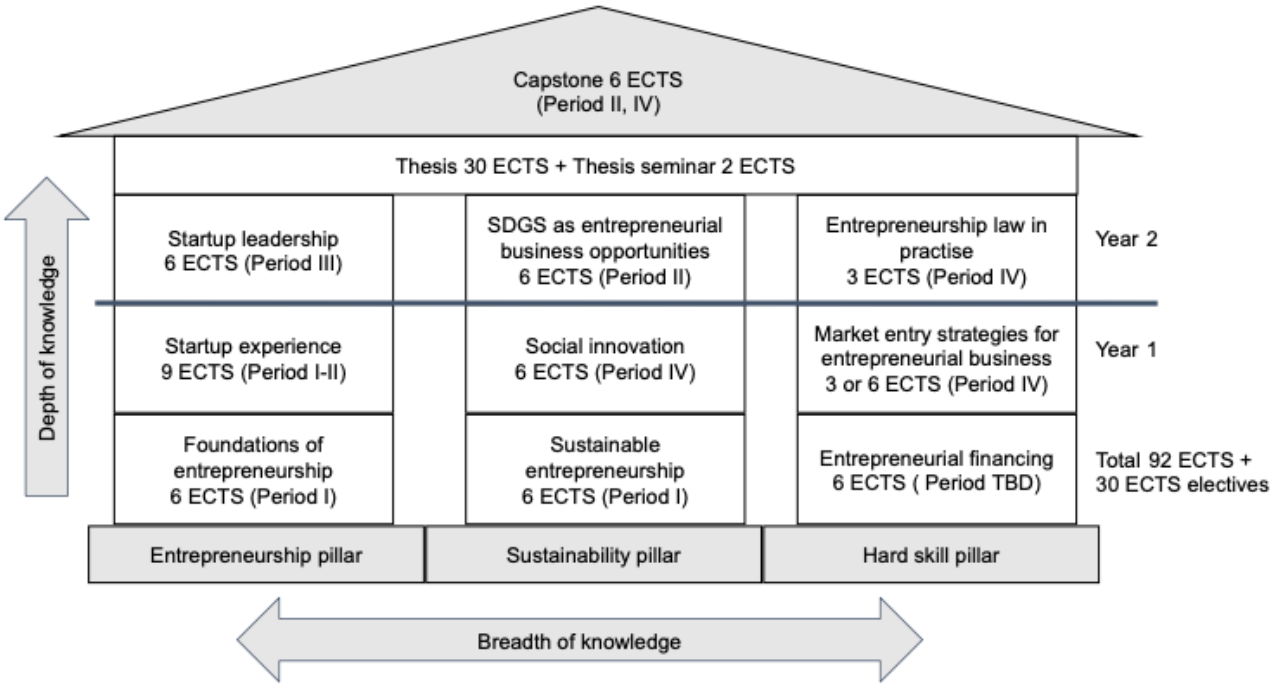

Fig. 1. Breadth and depth of core content

Benchmarking existing capstone courses in leading entrepreneurship programs was used to help design the proposed new capstone course. Common themes in the 10 benchmarked courses included offering students the opportunity to apply their entrepreneurship knowledge, tackle real-world challenges, network with experienced professionals, and receive feedback and mentorship while launching their ventures. Faculty from the two collaborating units were then invited to a series of ideation workshops to discuss the potential new courses and to make plans for their intitiation.

3 FINDINGS

This section describes the key findings from the background research conducted during the development process of the program. First, the student survey on entrepreneurial mindset showed that students' perceptions of entrepreneurship were mostly positive or neutral (46% positive, 46% neutral, 8% negative). Similarly, student interest in starting a company of their own was positive, with 15% saying they see themselves starting one in over 10 years, 38% saying that they see themselves starting one in 4-10 years, 13% in the next 3 years, 10% saying they have already had one, and 23% have no interest in starting a company. Interestingly, 32% of respondents saw solving sustainability-related problems as a motivator to becoming an entrepreneur.

Table 1. Student interest in starting a company of their own (AVP, 2022)

Already have	In 0- 3 years	In 4-10 years	In 10+ years	Never
10%	13%	38%	15%	23%

An interesting finding from the alumni survey was that 5 years after graduation, graduates ranked the perceived importance of expertise and skills in "entrepreneurial capacities" for their own career the lowest of 30 types of skill listed, ranking at 4, or "somewhat important" on a scale of 1-6. This can perhaps be accounted for by the fact that only 2% of the respondents were working as full-time entrepreneurs upon graduation, with 6% reporting part-time entrepreneurship (TEK, 2022). While the questions asked in the graduate survey were not the same as those in the student survey, the contrasting results (total 23% interest in starting their own company within 3 years for students, and 8% full or part-time entrepreneurship rate 5 years after graduation for alumni) show a shift in attitudes towards a more positive approach to entrepreneurship, and a need for more support to help dreams become reality.

These findings were used to inform the curriculum development process, which involved three stages: 1) identifying stakeholders and clarifying the program's purpose, 2) defining program-level learning outcomes, and 3) aligning teaching with the purpose and outcomes through course development.

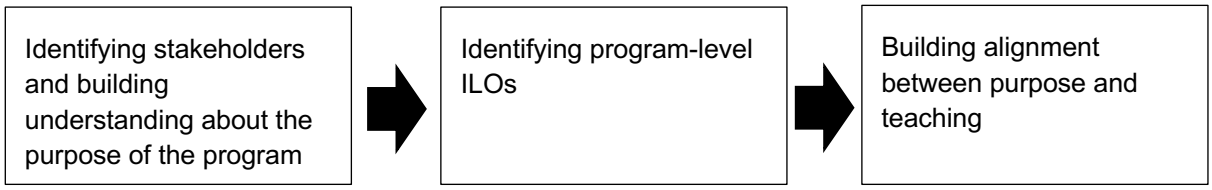

Fig. 2. Curriculum development process

First, engaging stakeholders and building understanding of the program's purpose were crucial in developing a relevant and high-quality curriculum. Collaboration with faculty fostered ownership and buy-in, while surveys and discussions with students and alumni revealed their expectations and career prospects, as well as testing the applicability of the ILOS to graduate experiences. Discussions with industry professionals helped identify areas of improvement, and feedback from university decision-makers ensured regulatory compliance.

Second, the identification of relevant program-level learning outcomes was an iterative process. The ILOs evolved several times as new information was uncovered via interaction with stakeholders. Third, building alignment between purpose and teaching was especially challenging as the program combines two elements: sustainability and entrepreneurship. Balancing the two themes and avoiding a disjointed approach required careful consideration. We've attempted to take this into account in our planning by consulting experts from both fields, and and by allowing students to design a part of the curriculum themselves by selecting electives.

4 CONCLUSIONS

This practise paper presents a comprehensive overview of the steps and considerations in designing a curriculum for a sustainable entrepreneurship major. The

curriculum development process involved three stages: 1) identifying stakeholders and clarifying the program's purpose, 2) defining program-level learning outcomes, and 3) aligning teaching with the program's purpose and intended learning outcomes through course development. While focused on a specific context, this methodology can be applied to other educational settings with some modifications.

In the case example, identified stakeholders included faculty members, potential students, alumni from related fields, industry professionals and decision-making bodies within the university. Inputs from potential students, alumni and industry professional were used to formulate the ILOs, while discussions with faculty and decision-making bodies were used to help structure the core content and build alignment between ILOs and teaching activities.

Designing a current and relevant curriculum in the dynamic fields of sustainability and entrepreneurship is challenging due to the risk of rapid obsolescence caused by emerging practices, technologies, and challenges, compounded by the time lag between development and implementation. Striking a balance between depth and breadth of knowledge within the two year timeframe of the study program may also required trade-offs. In the case example, incorporating hands-on elements and practical experiences, such as problem-based learning, are used to help students grasp the practical applications of sustainable entrepreneurship. Students are encouraged to develop and test a business concept and minimum viable product, addressing a genuine customer need while promoting sustainability.

Developing and implementating a sustainable entrepreneurship curriculum requires resources, such as faculty expertise, research funding, and access to sustainable business networks. HEIs wishing to develop a similar curriculum may encounter limitations in resource allocation, affecting the breadth and depth of the curriculum. Collaboration with industry partners is vital for relevance, but it can be challenging and resource-intensive to coordinate. In this case example, resource limitations were manageable due to the interdisciplinary nature of the program, with staff from two units collaborating on the design. The dual unit structure also increased the need for co-ordination, making the role of program manager especially important.

4.1 Limitations and implications

The main limitation of this study is its narrow scope, focusing on the curriculum development process of a sustainable entrepreneurship major in one context. Consequently, the findings may not be directly generalizable to other educational settings. Second, it does not provide insights into the actual implementation of the program, as it is based solely on the curriculum development process. This study emphasizes the need for further research to expand the knowledge base on sustainable entrepreneurship curriculum development. Investigating different settings, alternative approaches, and conducting comparative analyses could identify best practices, while longitudinal studies could assess program effectiveness.

A well-designed sustainable entrepreneurship curriculum has practical implications for multiple stakeholders. For students, it can offer knowledge and skills needed to create and manage businesses that are socially and environmentally responsible. For faculty, it can foster interdisciplinary collaboration and create opportunities for research, teaching and engagement with the community. For practitioners in business and

industry, it can provide graduates who are equipped with the ability to address sustainability-related challenges and create socially and environmentally responsible businesses. Ultimately, a sustainable entrepreneurship curriculum cultivates graduates who are able to become community leaders, creating businesses that prioritize the well-being of people and the planet.

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APPENDIX 1: CURRICULUM MAPPING OF CORE COURSES WITH PROGRAM-LEVEL ILOS

	Understand the principles of entrepreneurship and the systemic nature of social, environmental, and economic sustainability challenges	Understand how entrepreneurship can impact sustainability challenges and vice versa	Apply-scientific knowledge to critically evaluate the sustainability potential of entrepreneurial opportunities	Cultivate an entrepreneurial mindset to address sustainability challenges in a variety of managerial settings and roles	Develop the essential soft and hard business skills to experiment with and create sustainable new ventures
Foundations of entrepreneurship	x	x		x	x
Startup experience	x			x	x
Startup leadership				x	x
Market entry strategies for entrepreneurial business			x	x	x
Social innovation		x	x	x	
Entrepreneurship law in practice			x		x
Entrepreneurial financing			x		x
SDGs as business opportunities	x	x	x	x	
Sustainable entrepreneurship, markets, and systems change	x	x	x		
Capstone	x	x	x	x	x
Thesis + seminars	x	x	x		