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Institutional Framework for Design Entrepreneurship in Education

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Abstract: Entrepreneurship education and creating a supportive environment have been fundamental roles of universities for some time. The interdisciplinary nature of industrial design positions it as a crucial component of integrated innovation for businesses, with product entrepreneurship as a cornerstone of product creation. However, the multifaceted responsibilities inherent in the design field create a complex landscape for action, and the increasing demand for talented and entrepreneurial designers highlights the need for a revised industrial design curriculum that cultivates the skills and mindsets required to meet these demands. This paper emphasizes the significance of integrating design entrepreneurship education into the curriculum in a structured and progressive manner that addresses various levels of intensity and content. After defining the concept of entrepreneurship in design, the paper argues that a brief and cursory course on entrepreneurship cannot effectively foster personal development, which should be the primary objective of tiered entrepreneurship education. The paper posits that an entrepreneurial education model prioritizing student development should accompany a curriculum overhaul that enables students to apply theoretical knowledge to real-world situations, progressively develop entrepreneurial skills and attitudes, and cultivate a robust entrepreneurial mindset. In addition, the paper asserts that a business-oriented approach should be incorporated into design education to provide resources and services, as well as access to infrastructure and superstructure, to cater to the diverse needs of aspiring entrepreneurs.

Keywords*: design entrepreneurship; design curriculum; educational attainment; entrepreneurial attitude*

Introduction

The term *entrepreneurship* itself is neutral, but its perception can vary depending on context, such as the ethical and social impact of the business, the values and principles of the entrepreneur, and the overall effects on the community and society. In design, entrepreneurship is generally viewed positively among the skills and mindsets designers should possess. Designers are often seen as natural entrepreneurs due to their solution-oriented creative character and business processes (Güneş, 2012; O'Grady, 2012). While design inherently involves entrepreneurship, it is possible to distinguish between a designer and an entrepreneurial designer.

An adjective placed before *designer* implies a specialization or embedded ability that sets them apart from others. For instance, although designers and creative designers produce visual or functional solutions, the latter prioritizes generating novel and inventive concepts to create designs that distinguish themselves. Similarly, entrepreneurial designers possess a stronger business acumen and strategic outlook to establish prosperous and lucrative design enterprises. They typically participate in all facets of their design venture, such as product development, marketing, branding, and sales, to fulfill market needs and generate profits.

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Entrepreneurship can manifest in various ways in designer activities. The first type involves designers working in their own company, selling their products and services directly to individual end customers through the B2C model. The second type is design consultancy based on the B2B model. In this model, design consultants provide valuable design services and offer ideas and advice based on their experience working with past clients. The third type of entrepreneurship is the most common but less-mentioned method, where designers act as intrapreneur employees, taking risks and innovating within their organizations to create new products, services, or processes.

The difference between design and design entrepreneurship lies in using design as a tool to create and grow a business by producing and marketing the intellectual properties of a viable concept. Design entrepreneurship involves strategic decision-making capabilities in a competitive environment and a design mindset for societal and environmental problems in the context of economic growth and social welfare (Güneş, 2012). Developing the skills and mindsets needed for design entrepreneurship is crucial at every stage of design education. Design education should provide designer candidates with sufficient information and then guide their behaviors in the entrepreneurial process. Properly implemented entrepreneurship-based design education, including theory and skills training programs, will foster motivation to develop candidates' self-talent and nurture entrepreneurial intentions by creating new design-based businesses.

Although many studies report an increase in graduates' self-employment and entrepreneurial-focused activities as a positive outcome after entrepreneurship-based design education, some may question whether every designer should be an entrepreneur or whether simply doing their job well and having wage-based employment is enough to become a successful designer.

This study aims to investigate the development of entrepreneurship education in the higher education system and explore the reasons for the prevalence of entrepreneurship orientation in design education. Subsequently, the study evaluates the effectiveness of entrepreneurship-based programs and course structures in developing entrepreneurship competencies. Finally, the study examines the outcomes of these efforts through a literature review and discusses the impact of entrepreneurship education on design education competencies.

Entrepreneurship Education

Universities have always played an essential role in preparing students for future professional activities through education and training (Laredo, 2007). In recent years, entrepreneurial education has emerged as a critical third goal for higher education institutions, alongside education and research. This mission provides graduates with a promising career path and is consistent with higher education's goals of producing self-starters capable of identifying problems and devising solutions (Kuckertz, 2021). Entrepreneurship education has its roots in Harvard University's inaugural entrepreneurship course in the 1940s, and numerous colleges have since developed undergraduate and graduate programs on this topic (McMullen, 2019). According to Schulte (2007), entrepreneurial institutions should teach future entrepreneurs and instill an entrepreneurial spirit in all students, regardless of discipline. They should encourage students to think like entrepreneurs and give tools like business development centers, technology parks, and associated training to assist students and graduates in starting their enterprises. Thus, entrepreneurship education should be a part of all disciplines' curricula, with industrial design being a particularly relevant area focusing on creating products and services.

In reality, businesses strive to minimize transaction costs, produce competitive output, and offer alternatives to the market price mechanism. Companies must produce high-quality goods or services at a lower cost to gain a competitive advantage. As a result, products are the central element of organizations and are critical to their success and reputation in customer markets. The industrial design field plays a crucial role in integrated innovation for businesses due to its focus on product entrepreneurship, the cornerstone of product creation (Gunes, 2012), and its interdisciplinary nature (Hu et al., 2021). The broad responsibilities in the design field create a complex action scene and a growing demand for skilled designers. Thus, the traditional industrial design curriculum system requires revisions to develop skills and mindsets to meet the demands of new talent. However, design education occasionally lags behind the business world (Roald, 2006; Kiernan & Ledwith, 2014), and the business world demands new types of designers (Norman, 2011), necessitating changes and the dynamics of catching up. The design education curriculum integrates various articulated disciplines or inter-sub-discipline names, either at the beginning (e.g., service design) or end (e.g., design psychology) of the design expression or by directly integrating that discipline (e.g., marketing) or diluting it for designer candidates (e.g., economics for designers). The concept of entrepreneurship, the focus of this study, is also an area where such curriculum articulation occurs in various forms. Many programs have been developed on the relationship between design, entrepreneurship, and innovation. Entrepreneurship education in

universities generally takes three structures. Despite ongoing debates regarding whether entrepreneurship can be taught or whether the subject taught is entrepreneurship or small business management, the first structure is to provide entrepreneurship education as a mature and independent discipline. The second structure is entrepreneurship education offered in business schools, with the idea that entrepreneurship education is a critical field (Kuratko, 2005). In the third structure, entrepreneurship education is incorporated into all fields based on the premise that it is a fact and should be a standard part of undergraduate education. Entrepreneurship training and entrepreneurship-based practices offered in design education fall under the third structure. These training needs are typically met through compulsory or elective courses offered by business schools and those that consider the disciplinary characteristics of the departments themselves, as well as the integration of entrepreneurship practices into the department's main courses, such as the studio.

The European Commission's final report (2008) emphasized that entrepreneurship education should not be conflated with general business and economic studies. Its objective is to cultivate creativity, innovation, and self-employment. It may encompass the following components: fostering personal attributes and skills that form the basis of an entrepreneurial mindset and behavior, such as creativity, initiative, risk-taking, autonomy, self-confidence, leadership, and teamwork; increasing students' awareness of self-employment and entrepreneurship as potential career paths; engaging in concrete enterprise projects and activities; and imparting specific business skills and knowledge required for initiating and successfully managing a company.

In this regard, it is insufficient for design departments to offer education with one or a few stereotypical entrepreneurship courses, and diversified and enriched entrepreneurship training should be developed to address distinct requirements. Consequently, considering the discourses of the Commission, it is apparent that any 14-week entrepreneurship course offered at the undergraduate level, which frequently promotes entrepreneurship, cannot cater to the needs of prospective designers. Therefore, it is recommended to integrate entrepreneurship education with design education through interdisciplinary practical application, creating a new system that blends professional teaching and innovation and fosters robust entrepreneurial skills in conjunction with professional design skills. This system should embrace the principles of cognitive embeddedness, with curriculum, methodology, and cultural embeddedness (Yu et al., 2019).

The concept of entrepreneurship and its education are often subjected to criticism. Detractors of entrepreneurship argue that higher education should not train students for something inherently questionable and not based on natural science due to the concept's association with neoliberalism (Rae, 2010; Lackéus, 2017). Criticisms of entrepreneurship education focus on whether it can be taught (Fayolle, 2013), what is taught during the process (O'Connor, 2013; Pittaway & Cope, 2007), and how outcomes are measured (Liguori et al., 2018). Despite these ongoing discussions, entrepreneurship education in higher education remains relatively immature (Bellotti et al., 2012). There is a need to develop it without clichés and educational rigidity (Kuratko, 2005) and to create an environment for reality-based experience (Solomon, 2007).

In examining the integration of entrepreneurship education and practice into educational curricula, various opposing viewpoints can be elucidated from four perspectives. One significant constraint lies in the limitation of time and resources. Undergraduate programs typically entail a substantial course load and adhere to specific credit requirements for graduation. Introducing entrepreneurship courses could lead to a dilemma wherein core professional and elective courses might be sacrificed, or students might have less time to dedicate to their existing curriculum. Adding required courses may burden students, diverting their attention from their ongoing studies (Wang et al., 2022).

Another constraint stems from the diverse career aspirations of students. It is essential to acknowledge that not all students aspire to become entrepreneurs. Some may have ambitions in different fields, rendering entrepreneurship courses irrelevant to their career objectives. This is compounded by the understanding that entrepreneurship is not a pursuit suited for everyone, and societal needs do not mandate every individual to be an entrepreneur (Garavan & O'Cinneide, 1994; Johnson, 2001).

In specialized training, vocational programs are tailored to specific areas of expertise. While expanding the scope of specialization necessitates course diversification, it is imperative to strike a balance. Programs should offer profound knowledge within the specialization boundaries without diluting the core expertise.

Another perspective emphasizes the importance of maintaining equilibrium between practical experience and theoretical knowledge. Practical exposure holds immense significance in entrepreneurship (Gibb, 2011). Classroom-

based theoretical knowledge might not be as impactful as real-world experiences (Kassean et al., 2015). Consequently, there is an argument for courses focusing on experiential learning, enhancing students' employability post-graduation (Kuratko, 2005; Revans, 1978). This contention challenges the adequacy of entrepreneurship courses in preparing students for the job market.

A critical discourse emerges concerning economic challenges and resource constraints faced by universities. Institutions often encounter difficulties in securing additional resources and funding for existing programs. Introducing new courses and establishing requisite infrastructure may prove infeasible due to the associated operating and transaction costs. The allocation of budgetary resources for entrepreneurship activities at universities, as indicated by the European Commission's 2008 report, is notably limited, ranging from 180 EUR to less than 50 EUR per student, with a median of approximately 25 EUR (2008). Consequently, enthusiasm for entrepreneurial initiatives is frequently dampened by these budgetary constraints. While universities can supplement this budget through income from external entrepreneurial activities, the stability of this income flow remains uncertain. Moreover, the financial pressures on universities often drive them towards revenue-generating endeavors to cover expenses. This reliance on internal stakeholders' entrepreneurial capabilities raises concerns about universities straying from their fundamental academic mission and transforming into commercial enterprises, thereby challenging the concepts of the "entrepreneurial university" (Etzkowitz, 2014) or the "engaged university" (Goddard, 2009).

Entrepreneurship education is conceptualized as a process aiming to develop insight, self-confidence, knowledge, and skills (Jones & English, 2004) and as a method that requires practice and value creation as its focus (Neck and Greene, 2011). The question of whether entrepreneurs are born or made persists. Although it appears to be a simple question, considering the competencies an entrepreneur should possess, it becomes a much more complex equation. The literature presents different classifications of entrepreneurial competencies. Michelmore and Rowley (2010) identified 41 competence frameworks under four main headings. Tittel and Terzidis (2020) performed an extensive literature study on entrepreneurship competencies. They identified 57 qualification definitions under three basic categories (Personal, Domain, and Relationship Competence): knowledge, skills, and attitudes.

Possible Reflections of Entrepreneurship Education on Design Education

Given the purpose and structural similarity of designer and entrepreneurial competencies and mindsets, design education may increase the likelihood of offering designers the tools, information, networks, and support to help them build successful business models. Meinel and Krohn (2022) suggest that design thinking responds to the current demands of entrepreneurship education, prioritizing recognizing entrepreneurial opportunities with a user-centered approach and combining it with active doing, experimenting, and reflecting. While design thinking focuses on creating new and innovative ideas, solving human-centered problems, and seeking the following market opportunities, it is insufficient in developing entrepreneurial competencies.

In reality, a designer who has internalized design thinking is already in the early stages of the change in the mentality atmosphere demanded by entrepreneurship as a process, but in order for this mentality to turn into a lifestyle and action, practices and knowledge sets that require value creation in terms of method should be supported. Entrepreneurial skills are not developed alone, and the only way to truly prepare designers for entrepreneurship is through education focused and structured on design entrepreneurship rather than relying solely on routine design education. With such training, designers will be able to guide the new venture beyond bringing an innovative new product to market, with the specific skills of taking the initiative, personal sacrifice, creativity, and risk-taking at the earliest stages of their business development, including techniques such as market development, feasibility analysis, initial financing acquisition, and management to steer.

Various case studies in the literature explore integrating entrepreneurship education into conventional design education. These studies fall into distinct categories, primarily showcasing successful examples. The first category involves countries like the People's Republic of China and Taiwan, where entrepreneurship is embraced as a state policy permeating universities (Hu et al., 2021; Luh et al., 2022; Li et al., 2023). National entrepreneurship policies encompass diverse objectives such as promoting economic growth, supporting innovation, increasing employment, advancing technology, enhancing global competitiveness, addressing social issues, and diversifying the economy. These policies manifest through government initiatives, incentive programs, and financial support. Hu et al.'s (2021) study introduces the concept of integrated innovation design, enhancing innovative and entrepreneurial capabilities among industrial and product design undergraduates. Over five years, this approach significantly boosted students' capabilities, evidenced by increased intellectual property rights, post-graduation employment, and fruitful university-industry collaborations. Li et al. (2023) emphasize the role of innovation and entrepreneurship education in

developing creative industries. They discuss the benefits of innovative teaching reforms, "two-teacher" instruction, project-oriented learning, school-industry partnerships with incubation mechanisms, diverse faculty, curriculum enhancements, and government policies, facilitating a transition toward professionalism. Fang and Zhaofang (2011) propose an innovation and entrepreneurship education model aligning professional strengths with national/regional economies across content, curriculum, faculty, and guarantee systems. Luh et al. (2022) present a resource-intensive methodology called "Learning to Learn," broadening students' horizons through abundant learning materials and incentives. Entrepreneurship education in industrial design aims to nurture critical thinking and argumentation skills, resulting in 129 launched products during the study period. In this category, government-driven entrepreneurship policies integrate these training programs into curricula, providing financial support and ensuring sustainability through defined policies.

Another category comprises case studies where entrepreneurship is a university policy, although national support is unclear or partial. Examples include the Norwegian University of Science and Technology (Sigurjónsson & Boks, 2011), emphasizing proactive university thinking, and the Delft University of Technology Industrial Design Engineering case study (Coelen & Smulders, 2023), enabling students to establish startups. Ochs et al. (2003) introduce the Integrated Product Development Program at Lehigh University, emphasizing interdisciplinary collaboration and industrial exposure. A third category reports on integrating entrepreneurship courses into design programs. Elaver's (2015) study presents a hands-on project in an undergraduate Product Design curriculum, guiding students through product development. This approach prepares students for industry or entrepreneurship, deepening their understanding of Product design in broader business contexts.

These categorical case studies consistently demonstrate positive outcomes from integrating entrepreneurship education into design education, supported by various vital metrics. These include increased student startups and brands (Coelen & Smulders, 2023; Sigurjónsson & Boks, 2011; Elaver, 2015), augmented intellectual and industrial rights, product launches (Hu et al., 2021; Luh et al., 2022), enhanced employment readiness, university-industry collaborations leading to employment (Hu et al., 2021; Ochs et al., 2003; Li et al., 2023; Elaver, 2015), and high overall student satisfaction.

The primary motivations for integrating entrepreneurship education in design education stem from national and university-based entrepreneurship policies, proactive university approaches, interdisciplinary collaboration, dual-qualified teacher structures, campus mechanisms focusing on industrial exposure, project-oriented learning, curriculum enhancements, and environments fostering critical thinking and argumentation skills through diverse learning materials and incentives.

Institutional Framework for Design Entrepreneurship Habitat

In order to create a practical framework for design entrepreneurship, it is essential to recognize the breadth of the concept and understand that standard content and methods, such as monologue lectures and poorly executed project courses in university-industry collaboration, will not meet the expectations of design entrepreneurship. Instead, a gradual, inclusive, and well-developed design entrepreneurship habitat, considering intensity, content, and levels, should be integrated into the curriculum within a fictional structure, creating an enabling institutional environment for students for effective and visible outcomes. There are two main objectives in providing entrepreneurship education in universities and training entrepreneurial graduates: Developing entrepreneurial thinking and action through education (Lüthje & Franke, 2003) and generating new knowledge and technology (Gibb & Hannon, 2006); promoting and supporting entrepreneurial ventures through stakeholder engagement and resourcing (Herrmann et al., 2008). Realizing these goals is possible in two ways: through entrepreneurship education and the development of entrepreneurial thinking and action, through the support of entrepreneurial activities, and through the institution as an entity that becomes an entrepreneurial leader.

The initial step towards fostering entrepreneurial behavior in a habitat is to incorporate design entrepreneurship education in the curriculum, presented in a structured and progressive manner that caters to varying levels of intensity and content. In the subsequent phase, providing infrastructure and superstructure, including experimental setups, networks, incubators, business development collaborations, angel investors, technopoles, and technology transfer offices, is crucial for students to engage in desired learning and practices (Figure 1).

The fundamental objective of tiered entrepreneurship education is to focus on personal development, which cannot be attained through a brief and superficial course on entrepreneurship. Such a course may impart theoretical knowledge on entrepreneurship; however, its primary function is to serve as a coordinating course. Therefore,

offering comprehensive and practical entrepreneurship courses is essential, allowing students to gradually apply theoretical knowledge to real-world situations, develop entrepreneurial skills and attitudes, and cultivate a robust entrepreneurial mindset. Design entrepreneurship education that prioritizes student development should have three dimensions. The first dimension is a coordinating entrepreneurship course that provides primary theoretical education. The main objective of this course is to familiarize students with the concept of entrepreneurship, covering its origins, critical theories, and diverse approaches. For the course to be effective, it should be closely integrated with other pertinent courses, some of which may need to be drawn from other departments, such as marketing, intellectual and industrial property rights, fundamental business administration, and economics. This holistic approach will enable design students to acquire foundational knowledge in entrepreneurship and develop the requisite skills and synthetic frameworks necessary for devising and executing start-up strategies and ventures. These skills may include market research and forecasting, general management and orientation, strategic management, business operation and management, economic law, financial planning, and the management of intellectual and industrial property assets and their conversion into commercial value. As a foundation for other related courses or programs, the coordinating entrepreneurship course provides design students with a basic understanding of entrepreneurship and the field of work. This understanding can then be built upon in related courses, allowing for the interpretation of course learning in the context of entrepreneurship. The coordinating entrepreneurship course should have an organic relationship with other theoretical curriculum courses, such as Intellectual and Industrial Property Rights, Basic Economics, Marketing, Design, and Project Management, Introduction to Incoming Business, and elective courses from other disciplines, such as Negotiation, Market Research, Financial Management, Business Law, and Strategic Planning.

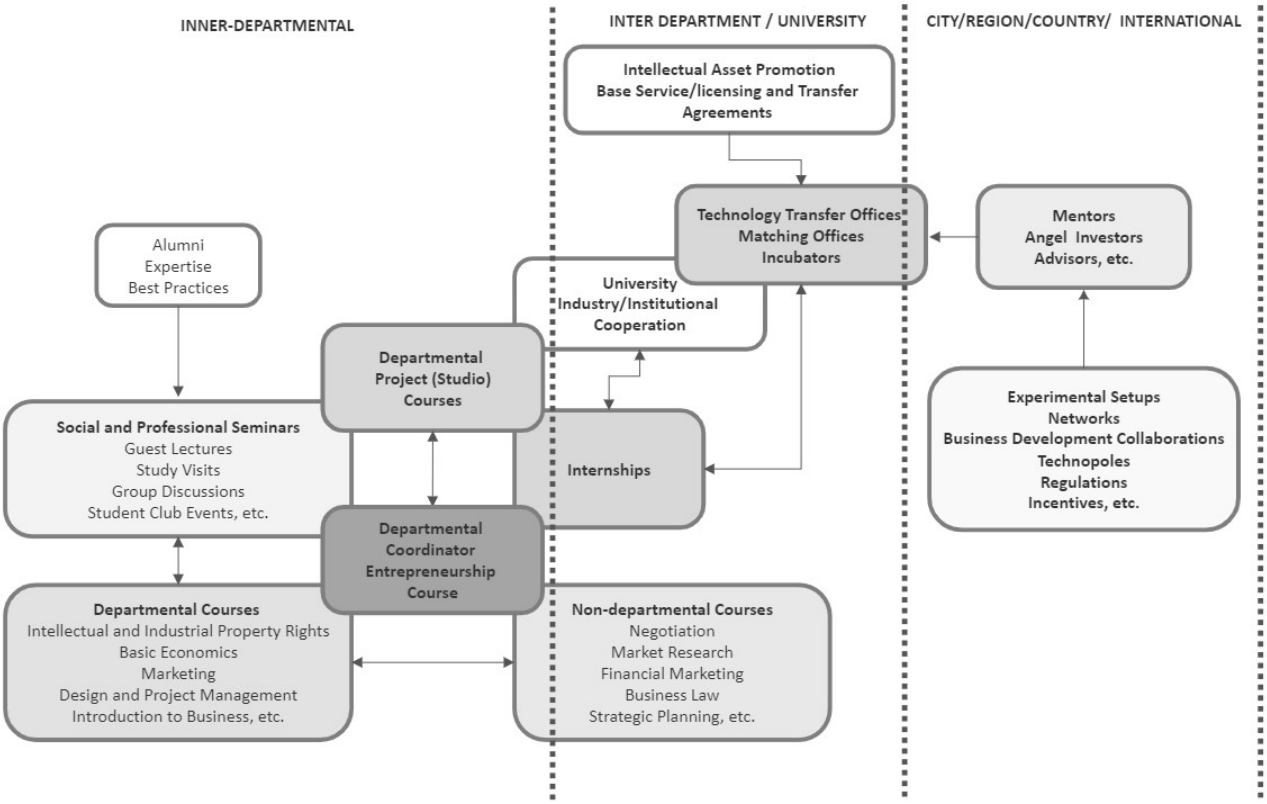


Figure 1. Institutional framework for design entrepreneurship habitat (Author, 2023).

The relationship between the coordinator entrepreneurship course and project courses constitutes the second dimension of the holistic design entrepreneurship habitat. In design departments, project courses generally commence with intellectual fiction in lower grades and progress towards prioritizing university-industry cooperation in upper grades to help students understand the market mechanism and gain practical experience. University-industry collaboration provides a simulation environment for professional life but also enhances research and development for mutual benefit, provides direct access to resources and markets, and creates a culture of learning and problem-solving, fostering entrepreneurship. Such collaborations go beyond fictitious fiction and address real-world problems and needs, providing contact with industry practices and standards with relatively tighter time and budget constraints.

These collaborations may result in direct employment, provide knowledge and experience of operational processes prior to employment, such as professional internships, and help students recognize the framework of intrapreneurship. Activities carried out with the coordinator entrepreneurship course enable students to start entrepreneurial activity within the context of their competencies while observing the needs of the industry and transforming the value created as a result of the project into commercial value within the framework of specific rights. Industry-collaborative project-based courses and internships should create a mindset for the intrapreneur designer in the context of human resource exchange, then the B2B type entrepreneur in the context of commercialization of intellectual property, and finally, the B2C type entrepreneur in terms of starting their own business.

The design curriculum's third and final dimension of entrepreneurship education involves sharing existing entrepreneurial experiences with students. The coordinating entrepreneurship course plays a significant role by organizing and promoting regular seminars (e.g., guest lectures, study visits, group discussions, student club events, etc.) featuring successful design entrepreneurs. These seminars highlight how students should think as potential entrepreneurs and what skills they should develop to succeed in the complex and uncertain business world. Furthermore, individual case studies and best practices of personal, domain, and relationship entrepreneurial competencies identified by Tittel and Terzidis (2020) for professional development and lifelong learning, such as teamwork, idea development, problem-solving, marketing strategy development, and ethics, should be included in the seminars to inspire students. It is essential to note that such professional activities can help students get a head start in their entrepreneurial journey, encourage them, stimulate their imagination with concrete evidence, and provide the most memorable and perspective-expanding ideas.

The second dimension of entrepreneurship education in design curricula involves a business-oriented practice approach that supports entrepreneurial activities and leadership and enriches the curricular outcomes. According to Groen (2005), external communication and collaboration with external organizations are crucial for institutions, as they act as intermediaries. Therefore, universities should prioritize external communication when creating entrepreneurial activities, particularly in project-based design courses, and view the industry as a key partner in mutually beneficial collaborations. Conducting joint projects with industrial partners during design courses can provide access to current market information, enable the use of industrial resources, create internship and employment opportunities, and potentially facilitate the transfer of intellectual property from universities to companies. These industry-supported projects can also promote the formation of start-ups, spin-offs, and industrial relations and contribute to the professional development of graduates. Design departments should consider industry-supported design studios as an intersection between educational and business focuses, with a continuous transition between them. Workplace internships are a passive means of transitioning between these foci and should be treated as a qualified guidance service that can enhance students' professional skills and socialization processes. In this context, it is crucial to acknowledge that internships serve as a valuable guidance service for professional development and are an area where design departments should make proactive efforts. Furthermore, internships play a vital role in the coordinator entrepreneurship course and should be considered an essential curriculum component. However, internships should be managed within the context of synchronization among educational institutions, students, and workplaces and should align with students' career planning and departments' strategic goals.

Universities should acknowledge the potential for each design project to yield licensable industrial property that generates social value and can be commercialized without aggressive commercial practices. Students ought to be incentivized to license the outputs of design studios, with universities providing technical, motivational, and financial backing in the licensing process. Instead of being relegated to static portfolios, student projects should be treated as intangible assets of the university, with a systematic process for developing, operating, maintaining, upgrading, and transferring such assets managed cost-effectively, considering all costs, risks, and performance characteristics after licensing. Universities' industry-institution collaboration offices should be tasked with inventorying, announcing, and making all commercializable intellectual assets visible, preparing various base service/licensing and transfer agreements on behalf of students, and collecting and reviewing proposals.

The business-oriented approach to design education encompasses a variety of elements that can be leveraged to facilitate the growth and development of design students as entrepreneurs. One key aspect of this approach involves providing students access to infrastructure and superstructure, including experimental setups, networks, incubators, business development collaborations, angel investors, technopoles, and technology transfer offices. As design education emphasizes creating value through products and services, providing resources can significantly assist students in translating their innovative concepts into thriving enterprises.

To effectively support aspiring entrepreneurs, universities must provide comprehensive resources and services that cater to their diverse needs. This may include access to mentors, industry professionals, experiences and insights, potential investors, office space, financing models, research facilities, commercialization services, marketing models, and scholarships. Additionally, design education often produces valuable and licensable outputs through project courses, which can be commercialized through various B2B and B2C models of design entrepreneurship. To facilitate the transfer of licenses in B2B settings, universities must make these licenses visible and create opportunities for students to connect with suitable investors. Similarly, to support B2C-style design entrepreneurship, universities should offer grants, scholarships, or other sources of funding for start-up capital through entrepreneurship centers or technology transfer offices. These resources can help students access alumni, faculty members, or industry experts who can provide guidance and mentorship as they navigate the commercialization process. Overall, providing infrastructure and superstructure is a critical component of the business-oriented approach to design education and can help students realize their potential as successful entrepreneurs.

Conclusion and Discussion

A comprehensive design entrepreneurship habitat is essential to create an enabling institutional environment for students to develop effective entrepreneurial skills and mindsets. It involves a structured and progressive curriculum, infrastructure and superstructure, and stakeholder engagement and resourcing to promote and support entrepreneurial ventures. The three dimensions of a comprehensive design entrepreneurship habitat are:

- Coordinating entrepreneurship course - a foundational course that introduces the concept of entrepreneurship and provides primary theoretical education closely related to other courses that need to be included in the curriculum. This course aims to develop the skills and synthetic frameworks necessary for developing and implementing start-up strategies and businesses.
- Industry-collaborative project-based courses and internships enable students to start an entrepreneurial activity within the context of their competencies while observing the needs of the industry and transforming the value created as a result of the project into commercial value within the framework of certain rights. These collaborations may result in direct employment, provide knowledge and experience of operational processes prior to employment, and help students recognize the framework of intrapreneurship.
- Sharing existing entrepreneurial experiences with students - regular seminars featuring successful design entrepreneurs, individual case studies, and best practices of personal, domain, and relationship entrepreneurial competencies identified for professional development and lifelong learning should be included in the seminars to inspire students. Such professional activities can help students get a head start in their entrepreneurial journey and encourage them to think as potential entrepreneurs.

The business-oriented approach to entrepreneurship education in design curricula offers significant opportunities for students to develop their entrepreneurial skills, create valuable outputs, and establish successful businesses. By prioritizing external communication and collaboration with external organizations, design departments can create mutually beneficial partnerships with industry that provide access to current market information, industrial resources, and potential employment opportunities. Internships and industry-supported design studios are essential components of the curriculum, offering valuable guidance services for professional development and creating opportunities for forming start-ups, spin-offs, and industrial relations. Moreover, universities should recognize the potential for each design project to yield licensable intellectual property that can be commercialized without aggressive commercial practices and offer technical, motivational, and financial backing to students in the licensing process. Facilitating access to infrastructure and superstructure, such as mentors, experiential learning opportunities, potential investors, office space, financing models, research facilities, commercialization services, and scholarships, is crucial in aiding students pursuing entrepreneurship. Adopting a business-focused approach to design education can enable universities to equip their students with the skills necessary to become prosperous entrepreneurs and contribute to the advancement of the design industry.

In the ultimate analysis concerning design departments, it is evident that crucial junctures in entrepreneurship education demand careful consideration, as they will profoundly influence the trajectory of progress. The first of these junctures pertains to deciding whether to incorporate entrepreneurship education. The second juncture revolves around the nature of entrepreneurship education, while the third centers on the delivery methodology.

Entrepreneurship education in universities generally aims to furnish students with practical skills essential to the business initiation process. These training programs encompass both theoretical knowledge about entrepreneurship and endeavors to enhance students' ability to tackle the practical challenges inherent in starting their ventures. The motivations behind these initiatives vary, encompassing the transition from a wage-earner culture to an

entrepreneurial ethos, fostering experience-based university-industry collaboration, increasing employment opportunities, and achieving measurable outcomes such as start-ups, job placement rates, intellectual property rights acquisition, and project realization.

However, it can be argued that all entrepreneurial concepts are inherently embedded within design education, rendering additional education that overwhelms the existing curriculum unnecessary. Some contend that programs emphasizing vocational education, often geared toward training staff for established businesses, should refrain from instigating entrepreneurial behavior in students. According to this perspective, refined vocational education can produce exceptional employees for the job market and empower graduates with an entrepreneurial spirit to excel in their enterprises.

Various educational institutions face pressure to transition from ivory towers to foster entrepreneurship within their ranks and cultivate entrepreneurial graduates through entrepreneurship education. Today, university administrations, driven by a desire to climb the rankings, impose entrepreneurship-based performance targets on programs. This, in turn, pressures staff and students to meet these objectives. Although programs may declare the goal of training "entrepreneurial designers," often, this aspiration is weakly linked in the matrices aligning program outcomes and courses. Hence, a fundamental question arises: Do these programs genuinely integrate entrepreneurship education with design education, or do they merely simulate entrepreneurship-oriented instruction by briefly introducing basic entrepreneurship concepts in a few courses? This decision demands profound discussion among programs to shape the future effectively. Entrepreneurship education, in the context of design education, necessitates existential, experiential, and transformational learning approaches. A curriculum devoid of this purpose devolves into storytelling, needlessly cluttering the educational landscape.

The second critical decision for designing programs aspiring to deliver integrated entrepreneurship education lies in the type of education provided: Should it be education for entrepreneurship or education about entrepreneurship? This distinction, though simple, holds profound implications. Some programs emphasize practical applications, while others focus on conceptual development. The pivotal issue here is the theoretical context in which this education is framed. Ideally, a dual approach should be adopted, wherein education begins with understanding and progresses into fostering entrepreneurship. While discussions about entrepreneurship often center on economic and managerial theories, producing entrepreneurs entails delving into the practical execution of sub-theories, such as network theories, organizational and consumption theories, leadership, and time and stress management. Therefore, it is imperative to instill entrepreneurial behaviors in students alongside theoretical knowledge.

The third juncture that programs must navigate is how to deliver education, a decision intricately tied to the preceding one. Producing entrepreneurs and cultivating students who exemplify entrepreneurial behavior are distinct yet interconnected objectives. Entrepreneurship education, tailored to train entrepreneurs, encompasses theoretical knowledge, business plan development, marketing strategies, and more. This approach aims to transform individuals lacking entrepreneurial knowledge and skills into entrepreneurs. In contrast, fostering students who exhibit entrepreneurial behavior models aims to impart theoretical knowledge and enable them to internalize entrepreneurial behaviors through real-world experiences. This approach empowers students to move beyond passive knowledge acquisition and become authentic entrepreneurs by applying this knowledge. Entrepreneurship education focusing on producing entrepreneurs is results-oriented, aiming to create and develop businesses. In contrast, developing a behavioral structure is process-oriented, striving for sustainable entrepreneurship beyond business initiation. This distinction encapsulates a paradigm shift in entrepreneurship education. Creating and developing a new business is not an end but a routine outcome of cultivating entrepreneurial traits such as risk-taking, innovative thinking, problem-solving, and leadership. Therefore, design programs must prioritize developing entrepreneurial behavior models, fostering theoretical knowledge, and exposing students to real-world experiences. This approach instills an entrepreneurial mindset that endures throughout their professional lives, emphasizing lifelong learning and continuous practical experiences rather than a transient entrepreneurial experiment confined within the boundaries of a single course.

The future of industrial design education necessitates an amalgamation of the skills inherent in designers with models of entrepreneurial behavior. This integrated approach, bolstered by entrepreneurship education, equips students to become intrapreneurs by launching their businesses or becoming intrapreneurs within organizations. The efficacy of entrepreneurial tools hinges on the mechanisms created for students, their experiences, education, personal qualities, and the contextual environment crafted during design education. This holistic approach enriches the educational experience and lays the foundation for a generation of innovative and entrepreneurial-minded professionals poised to make meaningful contributions to the ever-evolving landscape of design and entrepreneurship.

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