# Design Curriculum Reimagined: Leveraging Design Thinking for Educational Innovation

HALIM CHOUEIRY
American University of Science and Technology, Lebanon
hchoueiry@aust.edu.lb

**Abstract**

The present paper addresses the possibilities of using Design Thinking as a methodology and a tool to create a new educational curriculum in design at the Bachelor level. The paper is based on the case study of the Arts+Design Department at the American University of Science and Technology [AUST], a Lebanese university adopting the American credit system, and currently undergoing significant changes in its programs. The case illustrates particular opportunities and related challenges and reveals how design thinking has been effective to address intricate social and economic conditions of a challenging environmental context. But despite the circumstances, the Arts+Design Department created a human centred design curriculum that supports students in their learning journey, not only by disseminating knowledge and expertise, but also by empowering them to strategize and to fill gaps in their communities via problem solving, entrepreneurial thinking and design training. The new—currently still under development—curriculum spearheads the way towards a forward-thinking design program, which is both open to international ideas and simultaneously deeply rooted in its socio-cultural surroundings.

**Keywords**

design thinking, human-centered, curriculum design,process strategies, competency-based education

## 1 Introduction

The design of university curricula is a multifaceted process that balances educational goals, societal needs, and industry demands. Universities face challenges such as technological advancements—most recently AI (Johnson et al., 2021), balancing general and specialized knowledge (Smith & Anderson, 2020), managing stakeholder interests (Barnett, 2018), meeting accreditation standards (Williams, 2019), ensuring inclusivity (Brown & Caruso, 2021), and overcoming financial constraints (Gonzalez et al., 2022). Additionally, universities must maintain academic rigor while adapting to new paradigms (Knight, 2019), address globalization (Jackson & Miller, 2020), and cater to increasingly diverse student populations (Lee & Perez, 2020). Demands for curriculum innovation require continuous updates to reflect industry trends (Thomas, 2021) and interdisciplinary approaches (Anderson et al., 2019), alongside flexible learning models accommodating different styles (Davis & Kim, 2020).

Design Thinking has been effective in technology, stakeholder management, and education (Brown, 2009; Carlgren, Rauth, & Elmquist, 2016). While research has explored its use in teaching (Razzouk & Shute, 2012), its application to curriculum development remains underexplored

(Henriksen et al., 2017). The application of design thinking principles to the process of creating and refining educational curricula offers a promising yet underexplored avenue for innovation in educational design (Laurillard, 2012). Design Thinking's human-centered approach fosters flexible, student-centered, and future-oriented curriculum structures (Koh et al., 2015). Being also a human-centered approach that emphasizes empathy, ideation, and experimentation, therefore facilitating a holistic and creative problem-solving process (Brown, 2009), Design Thinking aligns well with educational goals by ensuring relevance and engagement (d.school, 2021), fostering creativity and innovation (Razzouk & Shute, 2012), and promoting interdisciplinary collaboration (Carroll et al., 2010). It also enhances problem-solving skills through the integration of experiential and project-based learning (Goldman & Kabayadondo, 2017), prioritizes faculty development (Kolb & Kolb, 2005), and establishes industry partnerships (Dym et al., 2005). Additionally, Design Thinking is instrumental in developing suitable assessment methods that reflect real-world challenges (Brown & Katz, 2011), and in supporting the creation of innovative curricula that respond to the needs of diverse student populations (Pohl, 2015). Finally, it emphasizes the importance of continuous iteration and feedback in the curriculum design process, ensuring that educational programs remain dynamic and adaptable (Fixson & Read, 2012; Koh et al., 2015). By incorporating these elements, Design Thinking can help to create curricula that are adaptive, innovative, and closely aligned with real-world needs, ultimately preparing students for the complex challenges of their professional careers.

This research explores the potential of Design Thinking as a tool for developing university design curricula at the Bachelor level, focusing on the Arts+Design Department at the American University of Science and Technology (AUST) in Beirut. AUST provides American-style education with a focus on critical thinking, research, and societal needs, making it an ideal case study for this examination. This paper includes a literature review on curriculum design, a detailed methodology, an empirical case study of AUST, and concludes with recommendations for future research and policy development.

## 2 Literature Review

### 2.1 Design Thinking

Design Thinking is a problem-solving framework that emphasizes empathy, ideation, and experimentation through a non-linear process of empathizing, defining, ideating, prototyping, and testing (Brown, 2009). It encourages creativity and innovation via iterative development and focuses on user-centered solutions (d.school, 2021). It fosters collaborative ideation and ensures practical, effective solutions through prototyping and testing (Razzouk & Shute, 2012).

Evolving from its origins in engineering and industrial design in the 1960s (Simon, 1969), Design Thinking became a formalized methodology in the 1980s and 1990s, particularly through IDEO and Stanford's d.school (Brown, 2008). Initially focused on product design, it expanded into business strategy and innovation (Martin, 2009), education, healthcare, and social innovation (Kolko, 2015). Design Thinking integrates human needs with technology and business success, making it applicable across disciplines (Buchanan, 1992). Companies like Apple and Google use it to drive innovation, improve customer experiences, and foster growth (Kelley & Kelley, 2013),

while in healthcare, it enhances patient care delivery (Meinel & Leifer, 2011). In education, Design Thinking fosters student engagement and problem-solving skills (Brown, 2008).

### 2.2 Design Thinking in Higher Education

Design Thinking has increasingly been adopted in higher education as a transformative tool for teaching and learning (Brown, 2008). This approach is particularly valued for its ability to foster creative problem-solving, critical thinking, and collaborative learning among students (Razzouk & Shute, 2012). Institutions like Stanford University's d.school use it to teach students problem-solving and innovation across disciplines (d.school, 2021). Studies show its use in classroom settings enhances student motivation and deepens learning by making abstract concepts tangible (Henriksen et al., 2017). It equips students with the tools to navigate ambiguity and uncertainty in a rapidly changing world (Carroll, 2015). As a result, Design Thinking aligns well with educational outcomes and 21st-century learning needs.

### 2.3 Present Difficulties in University Curriculum Design

Designing university curricula is a multifaceted process, balancing educational goals, societal needs, and industry demands (Ornstein & Hunkins, 2018). Challenges include keeping pace with rapid technological advancements, such as AI, which requires investment in infrastructure and faculty training (Johnson et al., 2021; Smith & Anderson, 2020). Balancing general education with specialization (Barnett, 2018) and accommodating diverse student interests and career goals (Williams, 2019) complicates curriculum design further. Faculty members value academic freedom in designing courses, while administrators focus on standardization and accountability (Brown & Caruso, 2021). Additionally, aligning curricula with industry needs without compromising academic integrity (Gonzalez et al., 2022), maintaining accreditation standards (Knight, 2019), and ensuring inclusivity and accessibility for diverse populations (Lee & Perez, 2020) are persistent challenges. Budget constraints often limit resources for faculty and technological updates (Anderson et al., 2019), further complicating efforts to keep curricula relevant.

### 2.4 Design Thinking as a Methodology in Curriculum Design

Design Thinking aligns well with curriculum design for several reasons. Its human-centered, iterative approach ensures curriculum relevance and adaptability through continuous feedback (Carroll et al., 2010). It fosters creativity and interdisciplinary collaboration, supporting innovation in design education (Razzouk & Shute, 2012). Prototyping allows educators to refine teaching methods and materials before full implementation (d.school, 2021), while integrating real-world problems provides students with practical experience (Goldman & Kabayadondo, 2017).

Design Thinking can be integrated into curriculum design through several key elements, including problem-solving, experiential learning, project-based learning, faculty development, interdisciplinary collaboration, industry partnerships, and innovative assessment methods. Razzouk & Shute (2012) highlight the importance of Design Thinking for developing students' problem-solving skills. Kolb & Kolb's (2005) Experiential Learning Theory suggests that learning occurs through cycles of concrete experience, reflective observation, abstract conceptualization, and active experimentation, all applicable in Design Thinking curricula. Project-based learning (Dym et al., 2005) improves student engagement and prepares them for real-world challenges.

Brown & Katz (2011) emphasize the importance of interdisciplinary collaboration, and Pohl (2015) highlights the role of faculty development in successfully implementing Design Thinking methodologies. Industry partnerships enhance curricula by providing real-world projects and mentorship opportunities (Fixson & Read, 2012). Koh et al. (2015) suggest alternative assessment methods, such as portfolio assessments, peer evaluations, and reflective journals, to align with Design Thinking principles.

## 3 Methodology

A case study research methodology was adopted for this paper, being a qualitative research approach that provides an in-depth understanding of a specific case within a real-world context and it is often used in social sciences and education to explore complex phenomena and gain insights that are not easily obtained through other research methods (Denzin, 1978).

A case study is a detailed examination of a single subject, such as an individual, group, event, organization, or community (Yin, 2018). The purpose of this methodology is to explore and understand the dynamics, processes, and relationships within a specific, real-life context (Stake, 1995). This methodology is also flexible and adaptable, allowing methods and techniques to be adjusted as the study progresses (Denzin, 1978).

The outcome of a case study research provides rich data through combining multiple sources of evidence and data collection, such as interviews, observations, documents, and archival records (Yin, 2018). Narrative analysis can also be used to construct a detailed description that tells the story of the case (Eisenhardt, 1989). The benefits of case study research include gaining a comprehensive and detailed understanding of complex phenomena, capturing nuances and subtleties that might be missed with other methods (Yin, 2018). It also allows researchers to study singularities in their natural settings, facilitating the exploration of context-specific factors and interactions (Stake, 1995). This methodology also encourages the use of diverse data sources, enhancing the robustness of findings and promoting triangulation, which strengthens the credibility of the research (Denzin, 1978).

At the end, case study research generates findings that are directly applicable to real-world situations, making it useful for practitioners seeking to understand and address specific issues (Merriam, 1998). It also contributes to theory by providing empirical evidence that can support or challenge existing theories and offers insights that can lead to the development of new theoretical frameworks (Eisenhardt, 1989).

## 4 Case Study AUST

The context of this case study is the American University of Science and Technology, Beirut, Lebanon.

### 4.1 Lebanon

Lebanon is currently facing a complex macro-environment characterized by significant economic, political, and social challenges. Since 2019, a severe economic crisis has caused the sharp devaluation of the Lebanese Lira, skyrocketing inflation, and widespread poverty. Political instability, coupled with corruption and governmental deadlock, has further eroded public trust (Maksad, 2020). The social fabric has been strained by the Syrian refugee crisis, putting immense pressure on Lebanon's fragile infrastructure and public services (El-Hage & Jabbour, 2021). The COVID-19 pandemic exacerbated these challenges, deepening economic and social inequalities. Environmental concerns such as waste management and limited natural resources also pose significant challenges, affecting public health and quality of life (UNDP, 2021). The education sector, in particular, is vulnerable, as universities struggle to adapt to rapidly changing conditions, highlighting the need for innovative solutions to navigate Lebanon's ongoing crises.

### 4.2 The American University of Science and Technology

The American University of Science and Technology (AUST) began operations in 1989 as the American Universal College (AUC) and was renamed in 2000 by presidential decree #3585/2000. AUST officially gained university status in 2007. AUST emphasizes excellence in teaching and research, providing affordable American-style education that promotes learning, critical thinking, and applied research. AUST prioritizes student-oriented learning and maintains strong national and international networks for collaboration, part-time and full-time employment opportunities, and research initiatives. The university's programs are modeled after those in the USA, offering high-quality education with a liberal arts foundation. AUST aims to graduate competitive, motivated individuals, fostering problem-solving and entrepreneurship skills. It offers flexible scheduling for working students and encourages applied research to address societal challenges. AUST operates four campuses in Beirut, Zahlé, Sidon, and Bhamdoun, with 32 undergraduate and 16 graduate programs and partnerships with over 60 international universities (AUST, n.d.).

### 4.3 The Current Challenges

In 2023, AUST's administration recognized the need to overhaul its Art and Design programs—Interior, Graphic, and Fashion Design—due to challenges heightened by the COVID-19 pandemic and Lebanon's economic crises. Issues included the rapid shift to online learning, economic instability affecting resources, brain drain, mental health concerns, student dropouts, and difficulties maintaining international competitiveness (Fawaz & Samaha, 2021; World Bank, 2021; Karam, 2021; UNICEF, 2021). To address these, AUST appointed a new Chairperson for the Arts+Design Department to lead a comprehensive curriculum redesign. Following research from October to November, which included faculty and student iteration, class observation and syllabus evaluations, the investigation highlighted several key issues: an outdated curriculum, delayed introduction of real design courses, over-reliance on manual tools, siloed course content, and a lack of entrepreneurship and innovation. The new Chairperson initiated the Design Thinking process in January 2024, involving student focus groups, faculty retreats, and side meetings. The agendas of those exercises, centered around the redesign of the existing design program and how it be can be evolved using design thinking as a main methodology. The student focus groups, averaging 15 students per session, began by gathering insights on current challenges and desired improvements in the curriculum, emphasizing empathy and understanding students' needs. The

faculty retreat, with 32 faculty presents from all three programs, focused on ideation, where faculty members collaboratively brainstormed and prototyped potential changes to the curriculum, considering the feedback from the student focus groups. The retreat also include sessions on aligning the proposed changes with industry trends and educational best practices. The follow-up side meetings were program dedicated, where faculty from the same program, both part timers and full timers, refined the ideas discussed in the retreat, iterated on proposed solutions, and discussed implementation strategies with key stakeholders.

The culmination of all phases boiled down to three distinct pathways, which can be summarized in the following titles: 1. The inheritance of an outdated curriculum, 2. The students' frustration, and 3. The underperforming student outcomes.

## 5 Interventions on the three pathways

The Design Thinking process was applied to craft a unique program preparing students for evolving design careers, aligning with the World Economic Forum's top skills for 2025, including analytical thinking, innovation, creativity, problem-solving, and leadership (World Economic Forum, 2024).
Chosen for its problem-solving abilities and as a unifying language across disciplines, Design Thinking fosters shared vocabulary in design, innovation, and human-centeredness, crucial for interdisciplinary collaboration. It enables students, educators, and industry partners to align diverse perspectives, drive creative exploration, and rapidly prototype solutions that meet real-world needs. By enhancing communication and fostering continuous improvement, Design Thinking empowers individuals to transform ideas into practical solutions.

### 5.1 Pathway 1: The inherited outdated curriculum

The current curriculum fails to foster innovation, leading to student projects lacking originality, creativity, and problem-solving. This stifles critical thinking, resulting in superficial work that relies on unchallenged assumptions. Without an entrepreneurial mindset, students are discouraged from exploring creative solutions or envisioning sustainable outcomes. A lack of research curiosity leads to repetitive, shallow projects. Additionally, the absence of advanced internships prevents students from bridging theory with practice, leaving them disconnected from industry trends and underprepared for the job market.

Design Thinking fosters innovation, analytical thinking, and entrepreneurial skills by integrating empathy, ideation, and prototyping into the curriculum (Carroll et al., 2010). It encourages continuous improvement, creativity, and interdisciplinary collaboration (Razzouk & Shute, 2012). Design Thinking promotes inquiry and reflection, aligning student projects with real-world market applications (Goldman & Kabayadondo, 2017), while fostering an entrepreneurial mindset that prepares students for the challenges of modern industries (Neck & Greene, 2011). The methodology fosters research curiosity through deep understanding, continuous inquiry, and experimentation, resulting in more informed design outcomes (Liedtka, 2015). Additionally,

Design Thinking helps students make informed internship decisions by aligning personal goals, company culture, and industry needs for a fulfilling experience (Stickdorn & Schneider, 2011).

### 5.2 Pathway 2: Students' Frustration

Lack of student interest leads to projects marked by minimal effort and shallow analysis, often caused by Lebanon's economic and safety challenges, which further diminish academic performance. Students, overwhelmed by external stressors, disengage from coursework, often perceiving their instructors' knowledge as outdated. This disengagement is compounded by over-reliance on easily accessible online information, resulting in projects that lack depth and originality.

Design Thinking enhances project engagement by fostering a student-centered approach that aligns with learners' interests (Brown, 2009). It empowers faculty to create engaging project briefs and emphasize the value of in-depth classroom learning, helping students move beyond superficial online research. This approach ensures well-integrated, original, and analytically rigorous projects, counteracting reliance on shallow internet searches (Liedtka, 2015).

### 5.3 Pathway 3: Underperforming students' outcomes

Students' work often lacks originality and depth when they resort to copying content with minimal adjustments. This leads to disjointed projects that misinterpret cultural references, show weak connections between ideas, and fail to deliver clear arguments. The improper use of AI further exacerbates these issues, producing impersonal work that raises concerns about academic integrity.

Design Thinking helps eliminate structural gaps that undermine the persuasiveness of projects. It assists students in refining their semiotic contextualization, producing work aligned with deeper meanings and resonating with the intended audience. It also aids students with short attention spans by fostering consistent, connected ideas, resulting in coherent thought processes and thorough topic exploration. Furthermore, foreign cultural elements in locally oriented projects will undergo proper analysis, ensuring relevance to the local context and avoiding mixed messages.

With the rise of AI platforms, students face challenges in effectively using AI-generated content. Design Thinking guides students in critically analysing this content and integrating personal insights, leading to more consistent and personalized projects. Moreover, it addresses concerns about academic integrity by minimizing reliance on AI for original thinking, preparing students for professional environments where problem-solving skills are essential.

## 6 Discussion of the Results

To tackle the above-mentioned existing challenges and address the long-standing student frustrations, the new curriculum is being developed with a focus on bridging the gap between academic instruction and industry expectations, ensuring that students are better prepared for real-world design challenges. Previously, the curriculum lacked integration between creative

theory and practical application, which often left students feeling underprepared for professional environments. In response, the redesigned curriculum emphasizes hands-on projects, interdisciplinary collaboration, and opportunities for real-world application. This shift aims to foster a more holistic and practical understanding of design, equipping students with both the creative and technical skills needed to thrive in their careers.

Moreover, the department engaged a diverse group of stakeholders, including faculty, students, industry professionals, and university administrators, to ensure that the redesign was comprehensive and responsive to the needs of all parties involved. Through multiple iterations, the curriculum was refined based on feedback from these stakeholders. This iterative approach allowed for continuous improvement and ensured that the curriculum was both innovative and grounded in the realities of design education.

Throughout the process, the proposed changes were carefully reviewed and discussed with the university administration. The administration's involvement was crucial for securing the necessary support and resources for implementation. After thorough feedback and eventual approval, the redesigned curriculum approved and currently set into motion, marking a significant departure from the previous structure. For instance, where the old curriculum primarily focused on theoretical knowledge, the new one integrates more experiential learning opportunities, such as design labs, industry partnerships, and collaborative projects with other departments. These changes are expected to have a profound impact on students, enhancing their ability to apply design thinking in real-world scenarios and improving their overall preparedness for professional roles.

The following table provides a concise comparison between the old and new programs, highlighting changes in the curricula specifically for the common courses in the foundation year across all three programs.

Furthermore, the department has committed to a continuous process of assurance in learning, recognizing that curriculum development is not a one-time task but an ongoing journey. Since this is still a work in progress, the Arts+Design Department will be undertaking regular assessments, student feedback, and industry input to make continual adjustments to the curriculum, ensuring it remains relevant and effective. This approach embodies a cultural shift towards continuous improvement and problem-solving within the department, fostering a mindset of innovation and adaptability among both faculty and students. By embracing this dynamic and iterative process, the department is ensuring that the curriculum will not only address current challenges but also evolve to meet future needs, making it an efficient and forward-thinking approach to design education.

| Before | After |
|---|---|
| Theories of Art course. | Design Culture course. |
| History of Arts course. Taught in a classic format with written exams. | History of Arts and Design course. Completely redesigned with project-based learning. |
| Drawing I course. Traditional drawing techniques. | Sketching for Designers course. Emphasis on visual perception. |
| Descriptive Geometry course. Geared towards Interior Design students. | Math for Designers. Redesigned to encompass all three design majors. |
| Computer software I course. Was a second-year level course. | Became a foundation year level course. |
| Design Studio I course. 2D skills, totally manual and by hand projects with a focus on technical skills. | Became a hybrid class with a combination of both hands-on and digital skills, with a focus on analytical skills. |
| Design Studio II course. 3D skills, totally manual and by hand projects with a focus on technical skills. | Became a hybrid class with a combination of both hands-on and 3D digital skills, including 3D printing, with a focus on analytical thinking skills. |
| Painting I course. | Removed. |
| Did not exist before. | Design Thinking course. |
| Did not exist before. | Design Entrepreneurship course. |
| Did not exist before. | Initiation of a new innovation hub, to support students in their entrepreneurship endeavor and assist them in both their curricula projects as well as personal innovations. |

**Table**: Comparison between the old and new programs.

## 7 Conclusion

In conclusion, this paper explored the use of design thinking as a framework for restructuring a university's Arts+Design curriculum. Unlike traditional applications of design thinking, it was employed to guide the entire curriculum redesign process, addressing existing challenges and aligning with industry needs. Design thinking resulted in several organizational advantages, including improved decision-making, greater stakeholder buy-in, and the creation of a curriculum that is both innovative and responsive to the evolving design field. However, limitations remain as the research is based on a single case study, limiting its generalizability to other contexts. The findings offer insights into bridging the gap between theory and practice in design education, emphasizing hands-on, experiential learning over theory-driven programs. Another limitation is that the redesigned curriculum has not been fully tested in practice, with real-world results still pending. Additionally, further research is needed to integrate theoretical frameworks like Experiential Learning and Constructivist Learning, which could enhance these efforts.

In the upcoming semester, efforts will focus on applying design thinking strategies while integrating educational theories into the curriculum design process. This next phase of research will test how these theories, in conjunction with design thinking, can create more effective, student-centered curricula. Embedding these perspectives aims to enrich practical outcomes and provide a comprehensive understanding of design thinking in curriculum development. By

bridging theory and practice, this approach will contribute to the development of adaptable, student-focused programs that meet the needs of the industry and society.

## 8 Recommendations

For further research, it is recommended that the application of design thinking be explored in the context of other curricula beyond the Arts+Design Department. Investigating its impact across different disciplines and educational programs could provide valuable insights into its broader applicability and effectiveness. Future studies should aim to test the redesigned curricula in diverse contexts to gather real results, enabling a deeper understanding of how design thinking influences student outcomes and organizational efficiency. Additionally, the potential of design thinking as a tool for decision-making and change management within educational institutions permits further exploration. This could involve examining its role in facilitating organizational change, fostering stakeholder engagement, and enhancing the adaptability of curricula to meet evolving industry demands. By expanding the scope of research to include these areas, a more comprehensive understanding of design thinking's utility in educational settings can be developed, offering a robust foundation for its implementation across a variety of contexts.

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