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Creating Change Through Design: A Cross-University Collaboration to Address Socio-Economic Challenges in China through Multidisciplinary Design-led Approach

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Abstract

This paper presents a cross-cultural, multidisciplinary design project – Creating Change Through Design - involving undergraduate students from Heriot-Watt University's Scottish Borders Campus (SBC) and Xi'an Jiaotong-Liverpool University (XJTLU) in China. The initiative aimed to ideate design-led solutions for emerging economic challenges in China: youth unemployment, declining business and consumer confidence, a rapidly ageing society, and issues related to waste and pollution (Mark, 2024). Through a series of collaborative online workshops, students engaged in design thinking and systems thinking to co-create socio-economic opportunities. The project concluded with an interactive digital exhibition, which contributed to the development of a global mindset, intercultural empathy, and employability skills among participants. This paper outlines the project's conceptual framework, methodology, outcomes, and its alignment with Heriot-Watt University's Strategic Plan (2025).

Keywords: Design-Led Learning; Cross-Cultural Collaboration; Design Thinking; Systems Thinking; UN Sustainable Goals 4 And 17

1. Introduction

Design has long been a catalyst for societal transformation. As Berman (2013) argues, designers wield significant influence over human culture and history, possessing the power to shape both the desirable and undesirable futures of humanity. In the context of global economic instability, design thinking offers a powerful methodology for addressing complex socio-economic challenges. This paper explores a cross-university project that leverages design thinking to ideate solutions to pressing economic issues in China, fostering intercultural collaboration and global citizenship among students.

Cross-cultural collaboration is invaluable for personal growth and self-development, enhancing both interpersonal and intrapersonal skills (Živanović & Ristić, 2021). Intercultural collaboration projects encourage greater self-awareness, empathy, and communication skills through reflective practice and collaborative engagement. Taras et al. (2021) found that contextual diversity—such as cultural background—enhances creativity, decision-making, and problem-solving. Cultural intelligence (CQ), the ability to effectively interact with people from different cultural backgrounds, can improve intercultural communication and positively influence self-development (Malay et al., 2024). CQ has been shown to be a protective factor that enhances students' intercultural development (Sharma & Hussain, 2017, Wawrosz & Jurásek, 2023, Guðmundsdóttir, 2015, Malay et al., 2024).

These benefits are most pronounced when teams actively manage cultural differences, leading to improved collaboration and innovation. Design-led projects, such as the Design For Change initiative, promote curiosity and

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autonomy while fostering collaboration, which impacts personal growth by identifying and creating opportunities for self-development (Robitschek et al., 2012; Cankaya, et al., 2018). Viewing engagement in culturally diverse environments through the lens of Personal Growth Initiative (PGI) theory suggests that adaptability, resilience and a deeper understanding of oneself and others are expected outcomes (Robitschek et al., 2012), indicating lifelong skills that significantly enhance students' personal growth and employability readiness.

1.1. Background and Rationale

China faces a constellation of economic challenges that demand innovative, interdisciplinary responses. There have been identified several critical areas that need attention, including youth unemployment, loss of business and consumer confidence, rapidly ageing society, and waste and pollution (Mark, 2024). These issues intersect with social, environmental, and technological domains, making them ideal for exploration through multidisciplinary design. The project brought together students from the School of Textiles and Design at Scottish Borders Campus at Heriot-Watt University in Scotland and School of Design at Xi'an Jiaotong-Liverpool University (XJTLU) in China to co-create design interventions that address those critical themes, using design thinking as a framework for ideation and problem-solving as well as systems thinking to develop worldview perspectives.

1.2. Design and Cross-Cultural Collaboration

Design, particularly in online learning environments, can be structured to promote cross-cultural collaboration through strategies like group work, cultural awareness activities, and internationalized curricula (Chen et al., 2006). These design elements foster inclusivity and mutual understanding among culturally diverse learners.

This initiative, Design for Change, was created out of curiosity towards exploring the potential of cross-cultural thinking to generate design solutions through active and intentional engagement leading to personal growth and self-development as individuals and as teams. It also aimed support participants in embracing their levels of PGI including intentionality of their design collaborations, planning for self-development and abilities to use available resources (Robitschek et al., 2012).

Collaborative design processes in multicultural teams can lead to both challenges and opportunities. Cultural heterogeneity in design teams enhances creativity and innovation, especially when co-creation sessions are used to bridge cultural gaps and align perspectives (Halskov & Christensen, 2018).

This design initiative engaged university students at undergraduate level by providing briefs explaining the project objectives, timeline and expected outcomes. Students voluntarily formed teams of maximum 4 individuals to work on one of four briefs related to emerging themes (Mark, 2024) such as youth unemployment, ageing society, business and consumer confidence, and waste and pollution.

The task invited participants to use their creativity, problem-solving, empathy, and analytical skills to propose a solution that addresses one of the challenges and present a new direction for China's future. The initiative design briefs emphasised the freedom that participating students must select the format of the proposed design solution, including slide presentations, video recordings, 3D designs, drawings, interactive designs, holograms to AI-supported concepts. This aimed to encourage students to embrace their curiosity for self-growth and development of fresh concepts following the criteria of innovation, feasibility, sustainability and user-centricity.

Evolving design patterns support remote, cross-cultural collaboration in design education, including shared visual languages, iterative feedback loops, and culturally adaptive communication strategies (Schadewitz, 2009). Participants of this design project were encouraged to work remotely across their teams to streamline communication and simplify diverse team members participation.

1.3. Design and Real-Life Challenges

Design thinking is a powerful and increasingly adopted methodology for addressing real-life challenges, particularly in educational contexts. It emphasises a human-centred perspective to problem-solving, focusing on empathy, ideation, prototyping, and testing (Brown, 2008; Brown, 2009). This iterative process enables learners to engage deeply with complex, "wicked" problems, fostering critical thinking, creativity, and practical skills essential for their future careers (Panke, 2019; Razali et al., 2022). Moreover, design thinking promotes collaboration and communication, as students work in teams to co-create innovative solutions, aligning with the development of 21st-century competencies.

Collaborative learning in design education has been shown to enhance academic motivation, deepen engagement, and improve the quality of design outcomes (Loes et al., 2017; Joseph-Mathews et al., 2022). Working in multidisciplinary teams also prepares students for real-world professional environments, where diverse perspectives and teamwork are essential to innovation and problem-solving. These collaborative experiences foster not only technical and creative skills but also interpersonal and leadership competencies, preparing students for future workplace through dynamic engagement with challenges while exploring possibilities (Fleischmann & Hutchison, 2012).

In this project, students were given approximately two months to design prototypes based on selected theme briefs that addressed real-life challenges. During this period, instructors introduced key concepts of design thinking and systems thinking through workshops, mini-talks and collaborative tutorials. Systems thinking, which complements design thinking by encouraging holistic analysis and understanding of interrelated components within complex systems, was integrated to deepen students' strategic and contextual awareness (Pourdehnad et al., 2011).

As a result, students developed a deeper, practice-based understanding of design for change. They were encouraged to apply their designer sensibility and utilise methods aligned with the critical elements of the identified challenges in China. The goal was to propose design solutions that not only addressed social and environmental needs but also offered consumer value and market opportunities, reflecting the dual imperative of innovation and impact in contemporary design education.

2. Methodological Approach

The project employed a design-based learning (DBL) pedagogical approach, as it appeared the most suitable to facilitate learning in the context of design activities carried in teams and individually (Zhang et al., 2024; Brown et al., 1989; de Vries, 2006).

Design thinking methodology was utilized to emphasise empathy, ideation, prototyping, and testing (Brown, 2009). Design thinking is particularly valuable for developing lifelong skills. It encourages a mindset of continuous learning and adaptation, as students are constantly challenged to think creatively and iteratively. This approach fosters critical thinking, problem-solving, and collaboration skills that are essential for personal and professional growth.

2.1. Importance of Systems Thinking

Systems thinking is increasingly recognized as a critical competency for addressing the multifaceted challenges of the modern world. It enables individuals to understand the dynamic interrelationships within complex systems, rather than viewing problems in isolation (Meadows, 2008). Senge (2006) emphasizes that systems thinking fosters a deeper awareness of patterns and structures that drive behaviour, which is essential for sustainable change.

Making systems thinking part of this design for change initiative enabled students developing a deeper familiarity with its value in handling complexity of challenges facing modern world and how design can bridge those interconnections or interdependent groups of elements forming a unitised solution.

Systems thinking can be viewed as a holistic approach that enhances decision-making by considering the broader context and long-term consequences (Arnold & Wade, 2015). Therefore, students by working on their design prototypes were continuously encouraged to go back to the principles of feasibility and user-centricity of their designs and contrast those against the China context and potential long-term outcomes.

Richmond (1993) argues that systems thinking cultivates critical thinking skills necessary for navigating uncertainty and complexity, particularly in educational and organizational settings. Sterman (2003) further supports this by demonstrating how systems modeling can improve strategic planning and policy design. Collectively, these perspectives underscore the value of systems thinking in equipping students with the tools to analyze, interpret, and respond to real-world challenges in a thoughtful and integrated manner.

Students are introduced to systems thinking to understand the broader socio-economic ecosystems influencing their design challenges (da Costa et al., 2019). Systems thinking enables students to see the interconnectedness of various elements within a system, helping them to identify leverage points for effective intervention. This holistic perspective is crucial for addressing complex, real-life challenges that cannot be solved through isolated solutions.

2.2. Workshops and Understanding Complex Concepts

Workshops play a vital role in helping students understand complex concepts such as design thinking and systems thinking. These interactive, hands-on learning environments enable students to engage with identified challenges, concepts of design and systems thinking in a practical context, fostering experiential learning and deeper cognitive engagement (Kolb, 1984). Through iterative cycles of ideation, prototyping, and feedback, students are able to internalize abstract concepts and apply them to real-world challenges, thereby enhancing both their conceptual understanding and problem-solving capabilities.

In the context of this design challenge, students participated in a series of collaborative workshops aimed at developing innovative solutions to pressing societal and economic challenges in modern China. These workshops were structured to introduce and reinforce key principles of design thinking—such as empathy, user-centred research, and iterative prototyping—while also integrating systems thinking to help students understand the broader implications and interdependencies of their design decisions (Meadows, 2008; Arnold & Wade, 2015).

Research has shown that such workshop-based, project-driven learning environments are particularly effective in cultivating critical 21st-century skills, including creativity, collaboration, and adaptability (McLaughlin et al., 2022; Lake et al., 2024). When students work together in multidisciplinary teams, they not only co-construct knowledge but also develop a shared understanding of complex systems and stakeholder needs, which is essential for addressing multifaceted societal issues (Fleischmann & Hutchison, 2012; Panke, 2019).

Moreover, workshops that focus on real-world challenges—such as those related to urbanisation, ageing populations, and environmental sustainability in China—encourage students to frame problems critically and explore culturally and contextually relevant solutions. This aligns with recent scholarship advocating for design education that is socially responsive and grounded in local realities (Lake et al., 2024; McLaughlin et al., 2022).

By engaging in these collaborative workshops, students not only gained technical and methodological proficiency but also developed a sense of agency and responsibility as emerging designers. The iterative, reflective nature of the workshop format allowed them to test assumptions, receive peer and instructor feedback, and refine their ideas in response to complex, evolving challenges—mirroring the dynamic nature of real-world design practice.

3. Theoretical Framework

Berman (2013) emphasises the ethical responsibility of designers to recognize their sphere of influence and use it to 'help repair the world.' This project operationalizes that ethos by encouraging students to engage with real-world economic and societal issues in China through a lens of social responsibility and global citizenship. The design challenge was structured around collaborative workshops where students addressed themes such as ageing populations, environmental degradation, and economic inequality—issues that are central to China's contemporary development landscape.

The theoretical foundation of this project integrates design thinking and systems thinking as complementary approaches to complex problem-solving. Design thinking, with its emphasis on empathy, iteration, and user-centred innovation, provides a flexible yet structured methodology for navigating ambiguity and generating creative solutions (Brown, 2008, 2009; Panke, 2019). Systems thinking, on the other hand, encourages students to consider the broader systemic context of their design interventions, including feedback loops, interdependencies, and long-term consequences (Meadows, 2008; Arnold & Wade, 2015).

This dual-framework approach is supported by Pourdehnad et al. (2011), who argue that integrating systems and design thinking enables learners to address "wicked problems" by shifting from linear problem-solving to holistic, adaptive strategies. In the context of this project, students were challenged to move beyond surface-level solutions and consider the systemic implications of their designs—such as how a product or service might influence social behaviours, economic structures, or environmental outcomes over time (Švirákova & Bianchi, 2018).

The workshops were also informed by critical pedagogy and experiential learning theories, particularly Kolb's (1984) experiential learning cycle, which emphasizes learning through concrete experience, reflective observation, abstract conceptualization, and active experimentation. This pedagogical model aligns well with the iterative nature of design thinking and the reflective depth of systems thinking.

Furthermore, the project drew on the principles of socially responsive design, which calls for designers to engage ethically and contextually with the communities they serve (Manzini, 2015; McLaughlin et al., 2022). By situating the design challenge within the socio-economic realities of modern China, students were encouraged to develop culturally sensitive and contextually grounded solutions that reflect both local needs and global sustainability goals.

4. Results

The cross-university project has successfully concluded, yielding significant benefits for the participating students. The collaborative activities facilitated by the project have led to the following outcomes:

4.1. Knowledge and Skills Development

Participants reported a deeper understanding of both Chinese and global economic contexts. They developed proficiency in design thinking and systems thinking, which are critical for addressing complex socio-economic challenges. Enhanced communication, collaboration, and project management skills were also noted, aligning with findings by Brown (2009). The design project also allowed students to embrace challenges that arise in groups of "creatives" contributing to development of their resilience by accepting ambiguity, risk, and resetting expectations, consequently driving adaptability and creative collaboration (Kolko, 2015).

4.2. Attitudinal and Behavioural Shifts

The project fostered empathy and accountability in design practice, as students learned to navigate cultural differences and work collaboratively towards common goals. Adaptability and leadership skills were particularly evident, supporting the conclusions of Cross (2011) and Liedtka (2018) on the transformative potential of design education.

4.3. Tangible Outputs

The project culminated in the creation of prototypes addressing one of the socio - economic challenges. These prototypes were showcased in a digital exhibition, demonstrating the practical application of design thinking and systems thinking. The exhibition provided a platform for students to present their work, receive feedback, and engage in reflective practice, echoing the benefits highlighted by Schön (1983) and Dorst (2011).

4.4. Academic and Professional Growth

Students gained valuable insights into the interdisciplinary nature of design and its role in solving real-world problems. The project contributed to their academic growth and enhanced their employability skills, as evidenced by increased confidence in their ability to tackle complex challenges. This aligns with the research of Lawson (2006) and Buchanan (1992) on the impact of design education on professional development.

4.5. Chinese context as perceived from the inside and from abroad

From the teachers' perspective, it was quite interesting to observe the difference in perception of the Chinese context by the participants located in China and by those located abroad. Foreign students would often propose a digital solution to a problem (e.g., an APP offering a business or city service), arguing that such a service does not exist in China and therefore, it will offer a novel solution. In practice, often, the ideas proposed by foreign students exist and known to the locals. However, due to the language barrier and limits of the international accessibility of the Chinese online services, they remain unknown to the foreign researchers. This gap offers an excellent opportunity for further investigation in terms of methodological and educational approach to such cross-cultural collaborations that would allow students and researchers find ways to access and interpret local digital contexts. Overall, the project has demonstrated the power of design thinking and systems thinking in fostering cross-cultural collaboration, enhancing students' skills and knowledge, and preparing them for future professional success.

4.6. Strategic Alignment

The project aligns with Heriot-Watt University's Strategic Plan 2025, which emphasizes engaged research and global collaboration. It embodies the principles of mutual benefit, intercultural dialogue, and digital trust, contributing to the university's mission of preparing students for global citizenship and professional success.

5. Conclusion

This cross-university initiative, Creating Change Through Design, demonstrates the transformative potential of design thinking and systems thinking in addressing complex socio-economic challenges. By fostering intercultural collaboration and multidisciplinary innovation, the project not only equips students with critical 21st-century competencies – such as creativity, empathy, and systems literacy – but also contributes meaningfully to the evolving discourse on the role of design in shaping equitable, inclusive and sustainable futures.

Moreover, the project serves as a dynamic platform for promoting lifelong learning and embedding good practice through international collaborations. By aligning with the United Nations Sustainable Development Goals – specifically SDG 4 (Quality Education) and SDG 17 (Partnerships for the Goals) – this design-led educational model underscores the importance of global partnership in advancing sustainable development. It highlights how design education, when grounded in real-world challenges and ethical responsibility, can catalyse systemic change and inspire a new generation of socially conscious, globally engaged designers.

Looking forward, this initiative offers a replicable framework for integrating design thinking into higher education curricula worldwide, reinforcing the value of experiential, collaborative, and purpose-driven learning in preparing students to navigate and shape an increasingly complex world.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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