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Collaborative Thinking, Collaborative Design, Collaborative Mindset: How Design-Led Education Supports Togetherness for Change

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Abstract: This paper explores how design-led education fosters collaborative thinking, design, and mindset to address complex socio-economic challenges. Drawing on a cross-university initiative, Create Change Through Design (or a shorter version: Design for Change) between Heriot-Watt University and Xi'an Jiaotong-Liverpool University, the study demonstrates how design thinking and systems thinking, embedded in intercultural collaboration, cultivate empathy, creativity, and global citizenship. The paper argues that collaborative design education not only enhances students' personal and professional growth but also contributes to sustainable, inclusive change in solidifying the sense of*togetherness* among individuals.

Keywords: design-led education, collaboration, SDG 4, SDG17, togetherness.

I. Introduction

Design education is increasingly recognized as a transformative force in addressing global challenges. As Berman (2013) asserts, designers possess the power to shape futures, making design a critical tool for social innovation. This paper examines how collaborative, design-led education nurtures a mindset of *togetherness*, enabling students to co-create solutions to real-world problems through empathy, creativity, design and systems thinking.

The concept of design-led education is rooted in the belief that design thinking can be applied beyond traditional design disciplines to solve complex problems in various fields. Design thinking, as defined by Brown (2009), involves a human-centered approach to innovation, focusing on understanding users' needs, generating creative ideas, and iteratively testing solutions. This approach encourages students to think critically, empathize with others, and collaborate effectively.

In recent years, there has been a growing recognition of the importance of collaboration in design education. Collaborative thinking, as described by Cross (2011), involves the collective generation of ideas and solutions through teamwork and shared knowledge. This approach not only enhances creativity but also fosters a sense of community and mutual support among students.

The integration of systems thinking into design education further strengthens the collaborative mindset. Systems thinking, as explained by Meadows (2008), involves understanding the interconnectedness of various elements within a system and identifying leverage points for effective intervention. By adopting a systems perspective, students can develop a holistic understanding of complex problems and devise strategies that address root causes rather than symptoms.

The cross-university initiative, Create Change Through Design, between Heriot-Watt University and Xi'an Jiaotong-Liverpool University serves as a case study for the effectiveness of design-led education in fostering collaboration and *togetherness*. Through intercultural collaboration, students from diverse backgrounds came together to tackle real-world challenges, learning to appreciate different perspectives and develop solutions that are inclusive and contextually relevant. Students were offered a platform to work together with collective intentionality to experience and nurture "jointness", "we-ness", "togetherness" (Searle, 1990; Gilbert, 1989).

This paper aims to demonstrate how design-led education, grounded in collaborative learning with its fundamentals in design thinking and systems thinking, can cultivate a mindset of *togetherness* essential for addressing global challenges, by developing socio-emotional competencies and deepening appreciation for diverse perspectives. By fostering empathy, creativity, and intercultural understanding, such initiatives prepare students to become agents of change in an increasingly complex world while realizing the importance of "we-intention" or "jointness" (Tollesfsen et al., 2014).

Context

China is currently grappling with a range of complex economic challenges that call for innovative, cross-disciplinary solutions. Key areas of concern include rising youth unemployment, declining business and consumer confidence, an ageing population, and escalating issues of waste and pollution (Mark, 2024). These challenges are deeply interconnected with social, environmental, and technological factors, making them particularly well-suited for exploration through multidisciplinary design approaches. In response, a collaborative project was launched, bringing together students from the School of Textiles and Design at Heriot-Watt University's Scottish Borders Campus and the School of Design at Xi'an Jiaotong-Liverpool University (XJTLU) in China. Using design thinking as a foundation for ideation and problem-solving, and systems thinking to foster broader perspectives, the participating students co-developed design interventions aimed at addressing these pressing issues.

Collaborative learning moves away from the conventional teacher-led approach, promoting a dynamic and participatory environment where students actively collaborate with one another to build knowledge. Grounded in socio-constructivist learning theories, it highlights the inherently social process of learning, suggesting that understanding is developed through interaction, discussion, and shared meaning-making. By drawing on the varied insights, skills, and backgrounds of peers, collaborative settings enhance critical thinking, innovation, and problem-solving abilities—preparing students to effectively navigate the challenges of an increasingly connected and interdependent world (Gracelin& Santhosh, 2024).

Collaborative learning was selected for this study to embody the transformative power of *togetherness* and innovation in educational practices – important factors that support knowledge, skills and growth which aid personal development and employability of future professionals. Through collaborative practice, students enhance their understanding of subject matters, develop socio-emotional adeptness such as teamworking, communication, conflict management and empathy, and cultivate the sense of community, belonging, togetherness, "jointness" or "we-intention" (Gracelin& Santhosh, 2024; Tollesfsen et al., 2021; Searle, 1990; Gilbert, 1989).

Design thinking and systems thinking form the dual foundation of this pedagogical approach. Design thinking emphasizes empathy, ideation, and iterative problem-solving (Brown, 2009), while systems thinking encourages holistic understanding of complex interdependencies (Meadows, 2008; Arnold & Wade, 2015). Together, they equip students to tackle "wicked problems" with adaptive, user-centred strategies (Pourdehnad et al., 2011). The elements of holistic thinking and collective awareness as well as empathy provide the common ground for *togetherness* or "jointness" and design thinking as well as systems thinking to find shared areas of interest such as empathy, awareness of externality and its challenges and the importance of cooperation.

Experiential learning theory (Kolb, 1984) and socially responsive design (Manzini, 2015) further underpin this framework, emphasizing learning through doing and ethical engagement with communities, such as in this study, a community of students and academics was essential for developing, launching and completing the initiative, create Change Through Design.

Design thinking, as a human-centered approach to innovation, has gained significant attention in recent years. Brown (2009) describes design thinking as a process that involves empathizing with users, defining problems, ideating solutions, prototyping, and testing. This iterative process encourages students to develop creative solutions that address users' needs and preferences. By fostering empathy and creativity, design thinking helps students become more attuned to the social and emotional aspects of problem-solving.

Systems thinking, on the other hand, provides a holistic perspective on complex problems. Meadows (2008) defines systems thinking as an approach that involves understanding the interconnectedness of various elements within a system and identifying leverage points for effective intervention. Arnold and Wade (2015) further emphasize the importance of systems thinking in addressing "wicked problems"—complex issues that are difficult to define and solve. By adopting a systems perspective, students can develop a deeper understanding of the root causes of problems and devise strategies that address these causes rather than symptoms.

Experiential learning theory, as proposed by Kolb (1984), emphasizes learning through experience and reflection. This theory suggests that students learn best when they actively engage in hands-on activities and reflect on their experiences. Design-led education, which involves project-based learning and real-world problem-solving, aligns with experiential learning theory by providing students with opportunities to apply their knowledge and skills in practical contexts.

Socially responsive design, as described by Manzini (2015), involves designing solutions that address social and environmental challenges. This approach emphasizes ethical engagement with communities and the creation of solutions that are sustainable and inclusive. By incorporating socially responsive design into design education, students can develop a sense of social responsibility and become more aware of the impact of their design decisions on society and the environment.

The literature on collaborative thinking in design education highlights the importance of teamwork and shared knowledge construction. Cross (2011) describes collaborative thinking as the collective generation of ideas and solutions through teamwork and mutual support. This approach not only enhances creativity but also fosters a sense of community and mutual respect among students. Taras et al. (2021) further emphasize the benefits of cross-cultural collaboration, which enhances creativity and decision-making by bringing together diverse perspectives and experiences.

The design initiative took place in digital learning spaces to allow interaction among geographically dispersed students and academics, this enabled intentional encouragement for collaboration across cultures, using tools like group projects, activities that build cultural awareness, and globally oriented curricula (Chen et al., 2006). These approaches help create inclusive environments and foster understanding among students from diverse backgrounds.
Theinitiative was born from a desire to explore how cross-cultural perspectives can inspire meaningful design dialogues that result in collaborative solutions. It focused on engaging participants in purposeful collaboration that supports both individual and team growth while enhancing the sense of togetherness. A central goal was to help students develop their Personal Growth Initiative (PGI), which includes being intentional in their design work, planning for personal development, and effectively using available resources (Robitschek et al., 2012), as

well as appreciate the value of "we-ness", "we-intention" that could be experienced through collaborative thinking.

Working in culturally diverse teams presents both difficulties and advantages. Such diversity can spark creativity and innovation, especially when co-creation sessions are used to overcome cultural differences and build shared understanding (Halskov& Christensen, 2018).
Undergraduate students were invited to take part in the project by choosing from four briefs that outlined the objectives, timeline, and expected outcomes. Teams of up to four students formed voluntarily to address one of four emerging issues in China (Mark, 2024): youth unemployment, an ageing population, declining confidence in business and consumer sectors, and environmental concerns like waste and pollution.
Participants were encouraged to apply their creativity, empathy, analytical thinking, and problem-solving skills to propose solutions that could contribute to China's future. The briefs allowed flexibility in how students presented their ideas—whether through slides, videos, 3D models, interactive designs, holograms, or AI-driven concepts—while emphasizing innovation, feasibility, sustainability, and user-centered design.
To support remote collaboration across cultures, the initiative incorporated evolving design practices such as shared visual tools, iterative feedback, and communication strategies that adapt to cultural differences (Schadewitz, 2009). Students were encouraged to work virtually, making it easier for diverse teams to collaborate effectively.

Cultural intelligence (CQ), as described by Malay et al. (2024) and Sharma & Hussain (2017), supports effective communication and self-development in intercultural contexts. CQ involves the ability to understand and adapt to different cultural norms and practices, which is essential for successful collaboration in multicultural teams. By developing CQ, students can enhance their intercultural empathy and communication skills, which are critical for effective teamwork and collaboration. This cultural intelligence that can be cultivated in collaborative projects intertwines with the sense of *togetherness* that can be characterized as "we-intention" where joint actions and decisions are influenced and informed by group dynamics and shared intentions with the latter rooted in the field of collective intentionality (Tollefsen et al., 2014; Bratman, 1999). Students and academics, by participating in collaborative learning, develop a mindset that embraces "jointness", "we-ness", *togetherness* allowing for diversity of social interactions to arise (Searle, 1990; Gilbert, 1989).

Workshops and team-based projects are common pedagogical strategies in design education. Kolko (2015) and Cross (2011) describe how these activities encourage students to navigate ambiguity, build resilience, and develop leadership skills. These experiences align with the Personal Growth Initiative (PGI) framework, which promotes intentional self-development and the pursuit of personal growth (Robitschek et al., 2012) as well as with togetherness mindset that is embraced by working collaboratively on design briefs. By engaging in collaborative projects, students can develop a sense of agency and become more proactive in their personal and professional development. Workshops conducted online, provided a platform for collective learning, offering plentiful opportunities for knowledge sharing, collaboration, connectivity and developing soft skills. The collaborative learning involved design and thinking and was founded on the sense of *togetherness* fostering mutual support among learners, community building, solidarity and belonging as well as active engagement where shared responsibility motivated students to partake in discussions and taking ownership of their design (Gracelin& Santhosh, 2024). In addition, through collaborative dialogues, debates, peer interactions, students gained different perspectiveson subject matters as their diverse cultural backgrounds informed co-construction of collaborative knowledge. With *togetherness* as a foundation of collaborative learning, the project promoted inclusive and equitable learning environment where students felt supported and empowered to be part of important discussions and contribute to shared goals.

Pedagogical Framework and Methodological Approach

This project employed a design-based learning (DBL) pedagogical framework, which has proven effective for facilitating both individual and collaborative design activities (Zhang et al., 2024; Brown et al., 1989; de Vries, 2006). Central to this approach was the integration of design thinking methodology, emphasizing empathy, ideation, prototyping, and testing (Brown, 2009). Design thinking fosters a mindset of continuous learning and adaptability, encouraging students to develop critical thinking, problem-solving, and collaboration skills essential for lifelong learning and professional development.

In parallel, systems thinking was incorporated to support students in addressing the complexity of contemporary societal challenges. Rather than viewing problems in isolation, systems thinking enables learners to recognize dynamic interrelationships within broader systems (Meadows, 2008). It cultivates awareness of underlying structures and patterns that influence behaviour, which is vital for sustainable change (Senge, 2006). By embedding systems thinking into the *Create Change Through Design* initiative, students gained practical experience in applying holistic approaches to complex design problems, particularly within the socio-economic context of modern China. This perspective encouraged them to evaluate the feasibility and user-centricity of their design solutions in relation to long-term outcomes (Arnold & Wade, 2015; Richmond, 1993; Sterman, 2003; da Costa et al., 2019) as well as realise the value of *togetherness mindset* that nurtures community building, solidarity and belonging, active engagement and promotes knowledge co-construction (Gracelin& Santhosh, 2024).

Workshop-Based Learning and Skill Development

A series of collaborative workshops served as the primary learning environment, enabling students to engage with design and systems thinking through experiential, hands-on activities. These workshops facilitated iterative cycles of ideation, prototyping, and feedback, allowing students to internalize abstract concepts and apply them to real-world challenges (Kolb, 1984). Working in multidisciplinary teams, students addressed pressing societal issues such as urbanisation, ageing populations, and environmental sustainability, as outlined in the project briefs (Mark, 2024), while practicing their socio-emotional intelligence through group work, communication and mutual respect (Gracelin& Santhosh, 2024).

Research supports the effectiveness of such project-driven, workshop-based learning environments in cultivating key 21st-century competencies, including creativity, adaptability, and teamwork (McLaughlin et al., 2022; Lake et al., 2024). Through collaborative engagement, students co-constructed knowledge and developed a shared understanding of stakeholder needs and systemic interdependencies (Fleischmann & Hutchison, 2012; Panke, 2019). Moreover, the workshops encouraged students to frame problems critically and explore culturally relevant, context-sensitive solutions, aligning with current scholarship on socially responsive design education (Lake et al., 2024; McLaughlin et al., 2022).

Ultimately, the iterative and reflective nature of the workshops not only enhanced students' technical and methodological proficiency but also fostered a sense of agency and responsibility. This mirrors the dynamic and evolving nature of real-world design practice, preparing students to navigate complexity with confidence and creativity.

Theoretical Framework

Berman (2013) underscores the ethical duty of designers to recognize their influence and contribute positively to society. This project reflects that principle by encouraging students to engage with pressing societal and economic challenges in China—such as population ageing, environmental issues, and inequality—through a lens of global citizenship and social responsibility.

The project is built on a combined theoretical foundation of design thinking and systems thinking. Design thinking offers a structured, yet adaptable process focused on empathy, iteration, and user-centred innovation (Brown, 2008, 2009; Panke, 2019). In contrast, systems thinking broadens students' perspectives by highlighting the interconnectedness of systems, feedback mechanisms, and long-term effects (Meadows, 2008; Arnold & Wade, 2015).

This integrated approach is supported by Pourdehnad et al. (2011), who argue that blending these two frameworks equips learners to tackle complex, "wicked" problems through holistic and adaptive strategies. Students were encouraged to think beyond immediate solutions and consider how their designs might shape behaviours, economic systems, or environmental outcomes over time (Šviráková& Bianchi, 2018).

The pedagogical design also draws on Kolb's (1984) experiential learning theory, which emphasizes learning through doing, reflecting, conceptualizing, and experimenting. This model aligns well with the iterative nature of design thinking and the reflective depth of systems thinking.

Additionally, the project incorporates principles of socially responsive design, which advocate for ethical, context-aware engagement with communities (Manzini, 2015; McLaughlin et al., 2022). By situating the design challenge within China's socio-economic context, students were encouraged to create culturally relevant and sustainable solutions that address both local needs and global challenges while developing their sense of *togetherness*as a result of collaborative thinking and collaborative design.

II. Conclusion

The cross-institutional initiative *Creating Change Through Design* illustrates the powerful role that design thinking and systems thinking can play in tackling complex socio-economic issues. By promoting intercultural collaboration and interdisciplinary innovation, the project not only helped students develop essential 21st-century skills—such as creativity, empathy, and systems literacy—but also contributed to the broader conversation about design's capacity to foster equitable, inclusive, and sustainable futures.

In addition, the project functioned as a dynamic learning environment that encouraged lifelong learning and the exchange of best practices through international collaboration. Aligned with the United Nations Sustainable Development Goals—particularly SDG 4 (Quality Education) and SDG 17 (Partnerships for the Goals)—this educational model underscores the importance of global cooperation in advancing sustainable development. It demonstrates how design education, when rooted in real-world challenges and ethical engagement, can drive systemic change and inspire a new generation of socially conscious, globally minded designers.

This project demonstrated the effectiveness of integrating design thinking and systems thinking within a design-based learning framework to address complex, real-world challenges. By engaging with pressing socio-economic and environmental issues in China, students were encouraged to adopt a socially responsible and globally aware design mindset. The collaborative, workshop-driven format enabled experiential learning, fostering critical 21st-century skills such as empathy, creativity, systems awareness, and cross-cultural collaboration.

Importantly, the project exemplifies how collaborative design education can serve as a catalyst for both personal and professional growth. Working in diverse, multidisciplinary teams allowed students to develop intercultural competence, adaptability, and a deeper understanding of stakeholder needs. This process nurtured a sense of *togetherness*, reinforcing the idea that inclusive and sustainable change is best achieved through collective effort and shared responsibility.

By addressing real-world challenges through iterative design and collaborative practice, students not only produced innovative solutions but also cultivated a sense of agency as emerging designers. The project highlights the transformative potential of design education to empower learners as changemakers—capable of navigating complexity, fostering inclusive communities, and contributing meaningfully to sustainable futures.

Looking ahead, this initiative offers a scalable and adaptable model for embedding design thinking into higher education curricula worldwide. It reinforces the value of experiential, collaborative, and purpose-driven learning in preparing students to navigate complexity and contribute meaningfully to a more connected, inclusive, and sustainable world.

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