

THE VALUE OF BEING LOST: WHY UNCERTAINTY MATTERS IN DESIGN EDUCATION

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ABSTRACT

Design education is often framed as exploratory, yet contemporary pedagogical practice frequently removes the uncertainty that makes exploration meaningful. This paper argues that ambiguity and constraint can function as deliberate pedagogical materials, supporting learning by creating productive friction rather than smoothing the design process. The discussion is situated within a second-year product design studio structured around two contrasting projects: an individual, ambiguity-driven exploration and a group-based Low-Tech project shaped by clearly defined constraints. Drawing on reflective teaching practice and routine studio artefacts, including sketchbooks, process books, critiques, and guided reflections, the paper examines how students engaged with uncertainty, limitation, and collaboration. Within this context, ambiguity enabled diverse interpretations, narratives, and forms of expression to emerge. At the same time, constraint-supported inclusive collaboration through shared evaluative frameworks and collective decision-making. Rather than treating difficulty as a barrier to inclusion, the paper reframes it as a condition that enables students to develop judgment, autonomy, and confidence. By presenting ambiguity and constraint as complementary strategies within a single module, the paper proposes designed friction as a means of valuing diversity of thinking and practice in design education, positioning being “lost” not as failure, but as a formative condition of studio learning.

Keywords: Design education, studio culture, ambiguity, diversity of thinking, learning through friction

1 INTRODUCTION

Design education should offer a space where learners are free to explore, yet the learning environments we create often seek to remove the uncertainty and ambiguity that make exploration meaningful. Contemporary pedagogical approaches tend toward prescriptive scaffolding, which undoubtedly supports some learners but can also act as a barrier which limits the development of autonomy, resilience and the capacity to be truly reflective. Björk and Björk’s[1] concept of desirable difficulties suggests that deep learning requires effort. In design, we can create this environment by embracing ambiguity rather than avoiding it.

This paper proposes that a degree of uncertainty, specifically managed to create the necessary conditions for learning, can be purposefully introduced. Dewey[2] describes that the feeling of difficulty is the starting point for reflective inquiry, while Schön[3] positions design practice in indeterminate situations, which require constant reframing of problems as designers work. These ideas provide the opportunity to reconsider confusion and uncertainty, not as pedagogical failings but as fertile spaces for learning – forcing students to make judgements and develop non-linear thinking. With this paper, the intentional incorporation of such conditions is referred to as designed friction.

The class which this paper reflects on is a second-year module in a BSc Product Design programme. The class is structured around two problem-based projects, each introducing distinct forms of friction, which ran for 6 weeks (half of the semester) for each. The first created friction through providing a large amount of creative freedom. Students worked individually with an open-ended provocation centred on *time*, using abstract interpretive lenses to develop a speculative design response. Many students initially felt lost and unsure how to begin but gradually learned to navigate this uncertainty through exploratory sketching, experimentation, and iterative reflection. They learned to navigate uncertainty and become more comfortable with ambiguity in the design process, developing greater confidence in self-directed decision-making.

In the second project, friction was introduced through constraints, where students worked in project teams on a human-centred “job to be done” that framed the problem space in terms of low-tech

constraints. This aligns with Illich's [4] notion of convivial tools in which limits encourage ingenuity. Within this project, friction was designed to be social and technical. Students were forced to negotiate diverse perspectives, long-held beliefs about the notion of technical process and efficiency and engage with alternative values of "good design".

By applying ambiguity and constraint as complementary pedagogical tools, this paper proposes the conceptual model of design friction. It argues that carefully structured uncertainty can act as a catalyst for learning, prompting students to reflect and adapt, and develop a more diverse and robust relationship with creativity. In this way, discomfort becomes part of the studio provocation, creating conditions in which diverse forms of thinking, participation, and design judgement can emerge, rather than converge toward prescriptive norms.

Conceptual Model: Designed Friction in Design Education

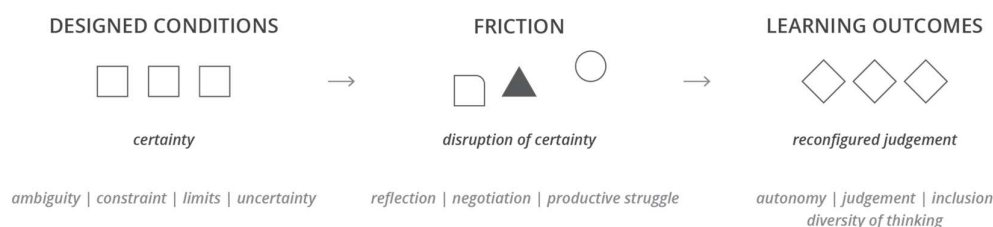


Figure 1. Conceptual model of designed friction illustrating how structured learning conditions are intentionally disrupted, leading to reconfigured judgement and diverse learning outcomes

2 APPROACHES

The reflections that inform this paper arise from routine classroom practice, including tutorial conversations, reviews, critique and structured reflective activities. The module cohort consisted of approximately 48 second-year students, working individually in Project 1 and in groups of 4-5 in Project 2. Class artefacts and reflections were produced to support learning and assessment, and are interpreted here as indicators of how students engaged with ambiguity, constraint, and collaboration across the two projects[5]. The patterns observed resonate with Kapur's[6] notion of productive failure in which early struggle can lead to later insight and increased confidence.

Interpretation was thematic and practice-led rather than formally coded. Teaching observations and reflective notes were reviewed alongside student work to identify recurring patterns in behaviour and decision-making, particularly moments where uncertainty, limitation, or disagreement prompted reframing, negotiation, or increased engagement[6]. Attention was paid to how students navigated difficulty individually and collectively, and how these conditions influenced autonomy, confidence, and participation.

This approach reflects the realities of studio education, where learning is revealed through process, dialogue, and making. This work seeks to offer practice-based insight into how ambiguity and constraint can be intentionally used as learning tools.

3 FINDINGS

3.1 Friction Through Freedom: Ambiguity in Individual Practice

Project 1 deliberately introduced ambiguity as a designed studio condition (rather than an absence of structure). Students were asked to engage with an open brief centred on time, using interpretive lenses, to develop a non-prescriptive outcome. From the outset, this produced a sustained sense of being lost for the learners. Early exploration frequently sought safety in familiar interpretations such as *timekeeping*, which were explicitly ruled out within the brief, creating confusion and resistance. The subsequent introduction of the lenses was initially met with scepticism, with some students perceiving them as an added layer of complication rather than support.

This disorientation was not treated as a problem to be resolved quickly. Instead, it was allowed to persist, requiring students to pay closer attention to their own assumptions, habits, and ways of working. Throughout the project, many students expressed uncertainty about whether they were “doing it right”, particularly in the early weeks of the project, where learners measured progress through sketchbook activity rather than visible outcomes. This sustained ambiguity demanded patience and trust, both in the process and in one’s own capacity to navigate it.

Sketchbooks became a central site where this struggle played out. Initially unfamiliar as primary design tools, they were sometimes used defensively, with students investing effort in aesthetic presentation as a form of positive procrastination[5]. The early use of sketchbooks as polished artefacts functioned as a defensive response to uncertainty, substituting aesthetic control for conceptual commitment. Over time, however, this performative impulse diminished. As deadlines approached and pressure increased, many students abandoned the idea of the sketchbook as a beautiful artefact and began to use it pragmatically as a working space. Pages became denser, more provisional, and more synthesised, with handwritten notes, diagrams, and sketches arranged alongside one another without the hierarchy that had been common early in the project. In post-project reflections, students frequently noted the value of having all thinking in a single physical space and the ability to “turn a new page” as a way to move forward when ideas stalled. Compared to digitally mediated work, reflections appeared tighter and more resolved, suggesting that the material constraint of the sketchbook supported synthesis rather than fragmentation[7].

Project 1: Making Sense of Ambiguity

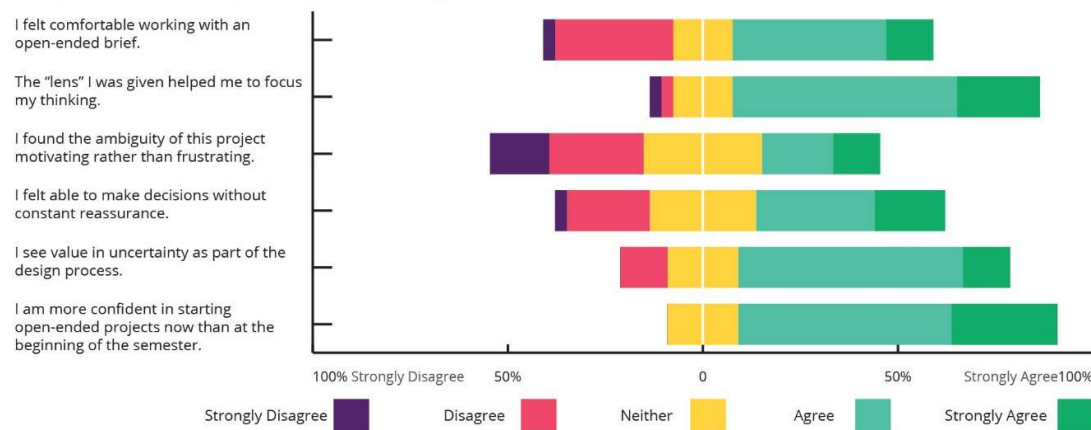


Figure 2. Student perceptions of ambiguity and decision-making during Project 1

As the project progressed, ambiguity shifted from initial confusion to productive struggle[6]. Students began to articulate their own values and metrics, asking not only what they were designing, but why it mattered, who it was for, and what it questioned. Ethical positioning, narrative framing, and experiential intent frequently preceded any formal or material decisions. Learners increasingly shifted from a linear thought process to an iterative approach, revisiting and revising earlier assumptions and ideas. Autonomy emerged not through freedom alone, but through the necessity of acting without external validation. Lecturers deliberately resisted early clarification of process, offering reassurance without validation and acting as critical interlocutors rather than guides toward specific outcomes, a role that has been discussed as supporting autonomy and reflective judgement in design education[8].

This autonomy was unevenly distributed, and intentionally so. Some learners stabilised late, while others never fully reframed their practice, often interpreting the brief as an invitation to produce artwork rather than speculative design. These differences were closely tied to engagement and attendance within the studio, underscoring the importance of studio culture in supporting difficult work[9]. [10]. Rather than being treated as a failure of the approach, this unevenness revealed differing tolerance thresholds for uncertainty and varying readiness to work without prescriptive direction. Learners with lower tolerance for ambiguity were supported through sustained studio presence, which provided greater lecturer feedback and peer visibility, ensuring that difficulty remained shared rather than isolating. Assessment data, compared to previous cohorts in this module, show increased differentiation within the class but

no decline in overall attainment, suggesting that ambiguity redistributed performance toward more diverse creative outcomes rather than undermining learning.

The first project demonstrates the value of being lost as a formative condition of the studio. Ambiguity required students to slow down, carefully consider their own thinking, and persist through uncertainty. The struggle was not always comfortable, nor was it uniformly resolved, but it demanded engagement and fostered resilience. In this sense, ambiguity functioned as a return to a core studio experience, in which learning is shaped by difficulty, reflection, and the gradual development of judgment.

3.2 Friction Through Constraint: Low-Tech Collaboration

The second project introduced a different form of designed friction by replacing ambiguity with constraint. Students worked in groups to design a Low-Tech, domestic tool, to complete a clearly defined job to be done. There were explicit limits on technological intensity, materials, and energy use. Where Project 1 expanded the problem space, Project 2 deliberately narrowed it. Constraint was framed not as a limitation to be overcome, but as a means of focusing attention and fostering collective responsibility. In this context, constraint operated as both a technical and a social condition[4]. Technically, students were required to prioritise sufficiency, mechanical clarity, and appropriateness over optimisation or automation. Socially, these limits structured collaboration by defining a shared evaluative framework to allow design teams to define what they considered “good design” for this brief. Early ideation often began broadly, but process books show rapid and systematic reduction. Tasks, rooms, and mechanisms were ranked, eliminated, or deprioritised, resulting in a tightly framed problem definition. Constraint acted as a stabilising force, enabling groups to converge without relying on instructor validation.

Project 2: Making Sense of Constraint

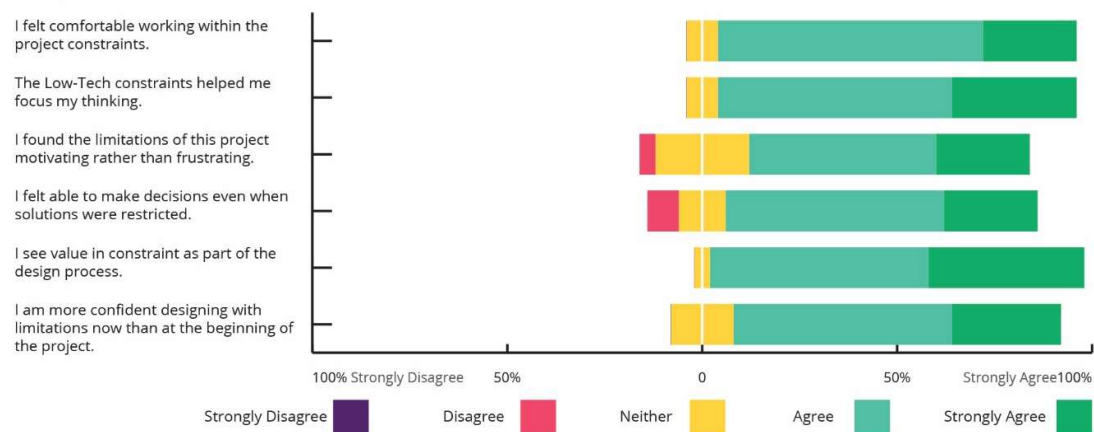


Figure 3. Student perceptions of constraint and decision-making during Project 2

Working within these limits surfaced moments of disagreement that became central to learning. Unlike the individual sketchbooks of the first project, process books made negotiation visible through comparative evaluations and annotated decision points. Ideas were debated not on the basis of novelty or ambition, but on the basis of user effort, clarity, and suitability. Disagreement did not stall progress but functioned as productive friction, forcing students to articulate values, accept compromise, and let go of more complex or expressive ideas in favour of what was sufficient.

Low-Tech artefacts played a critical role in mediating this process. Prototypes were deliberately rough and built to test specific actions within the design. These artefacts were not expressive or speculative; they were pragmatic tools for testing design limits. Failures were immediate and embodied, revealing awkwardness, inefficiency, or unnecessary complexity through use rather than dialogic critique. In many cases, physical testing led to either the development or abandonment of ideas that were initially appealing but impractical. Thus, this functioned as a reframing device, aligning the group's understanding around what was necessary rather than what was possible.

Authorship in Project 2 was explicitly collective. Reflections consistently refer to shared decisions and collective learning, suggesting that understanding emerged through dialogue and artefact-mediated negotiation rather than individual intuition[10]. Constraint reduced the dominance of personal

preference and supported more inclusive participation, particularly in groups with diverse working styles.

Together, these observations show how constraint can be used to generate a quieter, more structured form of studio friction. Where ambiguity in Project 1 demanded individual perseverance through uncertainty, constraint in Project 2 demanded collective discipline, compromise, and attention to sufficiency. Both forms of friction required students to engage deeply with difficulty, reinforcing the studio as a space where learning is shaped through struggle, negotiation, and sustained attention rather than ease or clarity.

4 EDUCATIONAL IMPLICATIONS

Using intentionally designed friction within the studio environment, space was created that allowed for diverse thinking, working and participating. The ambiguity evident in the first project allowed students to interpret the brief through their own experiences and values, resulting in varied design narratives rather than a convergence toward a single normative approach. This openness supported diversity of expression without requiring differentiated pathways, suggesting that uncertainty can enable inclusion by legitimising multiple forms of sense-making and design judgement.

The educator's role in sustaining such conditions is critical. Rather than resolving uncertainty, teaching centred on holding it, offering reassurance without validation, and encouraging students to trust their own emerging decision-making criteria. This positioned difficulty as a shared condition rather than an individual deficit, supporting students with different levels of confidence and prior experience. In this way, inclusion was framed not as the removal of challenge, but as the careful calibration of it, ensuring that friction remained productive rather than exclusionary and something visibly experienced by all working on the brief. One accessible starting point for introducing friction through freedom is to replace outcome-led briefs with an open provocation supported by interpretive lenses rather than deliverables. Constraint in the second project provided a complementary route to inclusive learning. Clearly defined limits required groups to establish a shared evaluative framework and collective responsibility. By prioritising sufficiency, appropriateness, and Low-Tech principles over optimisation or novelty, constraint reduced the dominance of individual preference and encouraged negotiation, compromise, and mutual understanding. Together, ambiguity and constraint operate as complementary pedagogical tools, supporting both individual expression and collective engagement, and positioning diversity not as a problem to be managed but as a resource that enriches learning.

Within contemporary discussions of inclusion, there is often an implicit assumption that accessibility requires increased scaffolding and the reduction of uncertainty. However, the findings in this studio class suggest a more nuanced position. Diversity of thinking does not necessarily flourish within tightly prescribed processes, where outcomes converge, and risk is minimised. Nor does inclusion require the removal of difficulty. Instead, structured friction can surface and legitimise different modes of participation, allowing students with varied thresholds for ambiguity, levels of confidence, and prior educational experiences to develop judgement in distinct ways. When difficulty is shared and carefully calibrated, it can become a collective condition rather than an individual deficit, enabling heterogeneity to emerge rather than be suppressed.

This recalibration of difficulty is reflected in student perceptions across both projects. In the first project, despite the inherent difficulty of an open-ended brief, over 50% of students found the ambiguity motivating rather than frustrating. Furthermore, a significant majority (over 60%) reported feeling more confident in starting open-ended projects by the end of the semester, supporting the argument that being “lost” functioned as a productive condition for developing autonomy.

In the second project, the shift toward a shared value set saw even higher levels of student alignment. Nearly 90% of respondents agreed that the “Low-Tech” constraints, which could be replaced by any number of conditions to produce friction, helped focus their thinking, and a vast majority felt comfortable working within these project limitations. These reflections by learners on the two projects suggest that while ambiguity fostered individual expression, the designed friction of constraint provided a stabilising structure that the cohort highly valued.

5 CONCLUSIONS

This paper has argued for the value of uncertainty and constraint as deliberate pedagogical materials within design education. Through two contrasting projects, Studio 201 demonstrates how designed friction can support learning by requiring students to engage with difficulty, make judgments in

indeterminate conditions, and negotiate meaning individually and collectively. Rather than smoothing the learning experience, ambiguity and constraint created space for diverse forms of thinking, expression, and participation to emerge. In this context, being lost was not a failure to be corrected, but a necessary condition through which students developed confidence, autonomy, and reflective capacity. Importantly, friction is not only an educational strategy but an increasingly articulated design stance within contemporary practice. Designers and studios who explicitly embrace friction position it as a catalyst for engagement, criticality, and meaningful interaction. By foregrounding friction within the studio, design education can cultivate not just tolerance for uncertainty but competence in working productively with it. As design responds to complex social and technological contexts, embracing friction offers a way to move beyond prescriptive processes and homogenised outcomes, positioning diversity not as a challenge to be managed but as a resource through which richer, more resilient design practice can be cultivated.

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