

PhD Dissertation

3.0 Developing the Socio-Cultural Theoretical Lens for the research

Multi-level and terrain-based Theoretical Framework

The design studio is often seen as the ideal setting for a constructivist learning approach, where knowledge is constructed through the learner's active engagement with the learning environment. While constructivism emphasises individual cognition, socio-cultural learning marks a shift to collective, socially mediated learning. As indicated in the literature review (sections 2.1 and 2.2), the socio-cultural learning lens offers additional effective strategies that may support student learning in studio contexts. At the heart of social learning is Lev Vygotsky's foundational idea that learning is shaped and enhanced through social interaction, culture and historical context, all factors aligned with the nature of learning in the design studio.

Building on this foundational idea that learning is shaped by social interaction, culture, and historical context, later theorists such as Leontiev, Engeström, and Lave reinforced the notion of social learning. Accordingly, this research adopts the position that effective collaborative learning in design is shaped by the social, cultural, and institutional environments in which it occurs. Therefore, studying and reflecting on these intrinsic factors is vital to understanding and sustaining robust collaborative studio pedagogies.

Within this research context, particular theoretical perspectives offer beneficial ways to understand collaboration in design studios. While Communities of Practice (Lave & Wenger, 1991) resonates with the situated and social nature of learning that characterises studio environments, Scaffolding (Vygotsky, 1978) and Activity Theory (Engeström, 1987) provide stronger tools for examining how collaboration actually develops and transforms through the

design process itself. These lenses enable an analysis of collaborative learning concepts, such as the zone of proximal development, expansive learning, division of labour, tools, and forms of instructional scaffolding, as they evolve and shift across social interactions within the design studio culture. Systemic concepts, such as the network of influence and assemblages that support collaborative learning, can be understood through the lens of socio-material theory, such as actor-network theory.

To effectively examine, formulate and sustain collaborative learning systems, it is essential to locate and understand collaboration across the multiple, interrelated levels at which the design pedagogy operates. This research situates collaborative pedagogy at three interconnected levels: the institutional, the studio, and the learning event within the studio.

At the micro level of the learning event, Scaffolding Theory offers a framework for examining learners in real-time interactions. At the meso level of the studio, Activity Theory (Engeström, 1987). provides a way to align collaborative learning with the design activity itself, tracing how tools, tasks, and social roles mediate learning processes. At the institutional-macro level, the research draws on Actor-Network Theory (Blok et al., 2019; Yao & Liu, 2022) to explore how networks of human and non-human actors, such as technologies, curricula, policies, and other activities, shape and influence collaborative pedagogical practices.

The following sections will outline the specific theoretical constructs and models that support this multi-terrain-based understanding of collaborative learning in the design studio.

3.1 Establishing the need for the three-level framework

Rationale for three levels in the framework

The literature indicates that collaborative learning in architecture and design education is addressed at either the curricular or pedagogical level. Pedagogical strategies emphasise collaborative methods and learning interventions to support co-learning. Curricular reform positions collaboration as a means to align with architecture's interdisciplinary nature and the contemporary concerns of sustainability. Often, the ways in which these two primary concerns or approaches converge and interact to facilitate collaborative learning are not fully understood.

In contrast, this research positions the design studio as a living site for engaged collaborative learning. Collaborative learning is shaped as much by institutional-level policy as the real-time studio organisation through which learning is produced and sustained in studio settings. The nature of collaborative learning is further moulded by interactions, in which collaborative methods, tools, norms, and processes guide learning as it unfolds.

To really engage with collaborative learning as an ecosystem of conditions, practices, and interactions, a three-level framework approach is adopted to examine collaboration across interconnected scales: the institutional level, the studio level, and the micro-level of interactions within learning events. This multi-level approach enables the study to account for collaboration as a pedagogical structure, an interactional process and an institutional enabling system.

Rationale for borrowing multiple theoretical concepts

The leading theory this research draws on is activity theory. The secondary theories it relies on are actor-network theory and scaffolding theory. Each of these socio-cultural theories

foregrounds different aspects of learning and collaboration. Rather than adopting a single theory, this research draws on a set of complementary theoretical lenses that together support its analytical aims and objectives.

Central to this framework is activity theory, which establishes the socio-cultural perspective on collaborative learning and examines it as an activity system of interrelated elements, such as tools, community, and rules of division in design tasks. While scaffolding theory provides strategies for examining the roles of peers and faculty as guides in collaborative learning, actor network theory offers tools for examining how institutional policies and assessment systems shape, stabilise, and sustain collaborative practices over time.

As this research operates at multiple levels and terrains, it needs a framework that can account for collaborative processes, studio organisation and institutional conditions simultaneously. The resulting framework is treated as a single integrated theoretical framework, explicitly designed to observe, analyse, and improve collaborative learning in studio pedagogy. The theoretical framework adopted is selective rather than exhaustive. For instance, while Communities of Practice is highly relevant for understanding learning through participation and legitimate peripheral participation, it is not central to this research. The analytical focus of this research lies less on identity formation and membership trajectories and more on the dynamics of collaboration within studio learning events.

The following section discusses the evolution and key constructs of Activity Theory, Scaffolding Theory, and Actor–Network Theory, and outlines how these theories are operationalised within the three-level framework adopted in this study.

3.2 Discussion of Theories

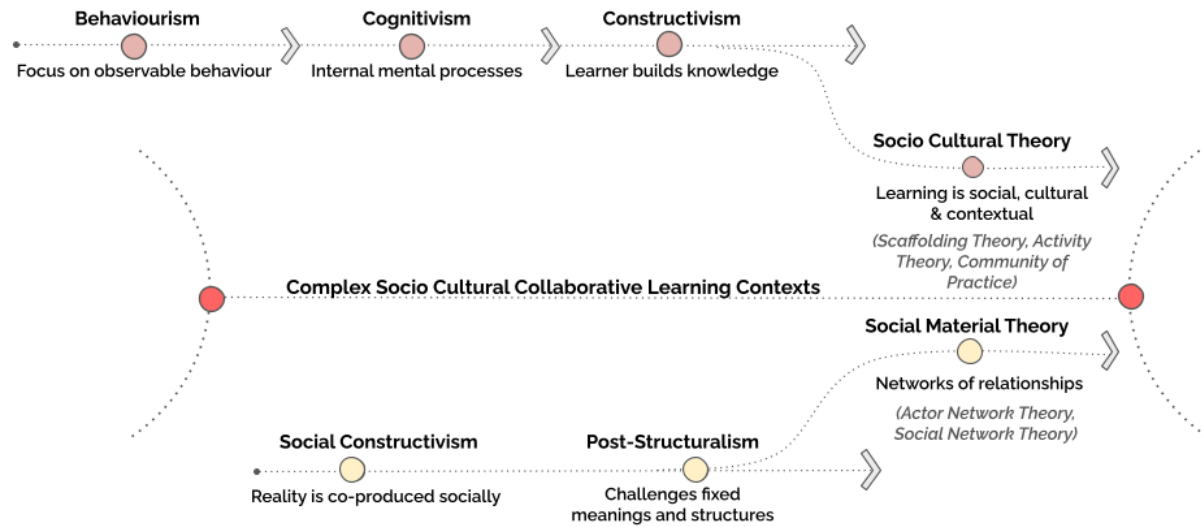


Figure 3.1: Evolution of Social Theories

While this research draws on multiple theories, they are not conflicting but emerge from the broader tradition of social theory. The intention is not to accumulate various theories in the framework but to use their conceptual tools as analytical lenses through which collaborative learning in the design studio can be examined and articulated.

When learning and collaboration are viewed as socio-cultural phenomena, they must be understood through multiple perspectives: those of identity, power, and hierarchy, as well as the collective activity systems that shape them. Accordingly, this study adopts a layered theoretical approach: Activity Theory serves as the meso-level anchor connecting social, material, and cultural aspects of learning; Scaffolding Theory provides a micro-level view of interaction and support; and Actor-Network Theory extends the lens to the macro-institutional level, showing how human and non-human actors co-produce collaborative environments.

This layered theoretical approach responds to calls in educational research to move beyond single-theory analyses and develop frameworks capable of addressing the complexity of learning in socio-cultural contexts (Sawyer, 2005; Daniels, 2016; Engeström & Sannino, 2020).

3.2.1 Activity Theory

Activity theory, or Cultural-historical activity theory (CHAT), originated in Soviet Psychology and was popularised by Engeström. The theory is ideal for examining how social, cultural, and material contexts shape human action. The theory is visualised as a triangular framework with nodes representing a subject(s), an object (objective leading to the outcome), tools, rules, community and division of labour. The theory emphasises the importance of understanding purposeful, meaningful **activities** rather than isolated tasks. It helps identify the system's significant activities, the actions and mediating tools of each activity (which can be primary, secondary, or tertiary), and the tensions within and between the activities.

AT's central concept, mediation, is 'the idea that humans' interaction with their environment cannot be direct but is always mediated through tools and signs' (Igira & Gregory, 2009).

Activity is used as a **dialectical relationship** between subject and object, who is doing what and for what purpose, and is driven by communal motives and oriented toward transforming objects, which can be material or conceptual (Kaptelinin & Nardi, 2006; Engeström & Pyörälä, 2020; Engeström, 2000).

Activity theory may help clarify how design tools and mediational artefacts mediate learning (Jenlink, 2001; Bender et al., 2017). The theory emphasises the importance of context, showing how design studios function as communities of practice (Jonassen & Rohrer-Murphy, 1999;

Bender et al., 2017; Jenlink, 2001). The theory and its concepts are thus well-suited to understanding the design studio as a community of practice, the core context of this research. While activity theory may be suitable for assessing human activity, it is limited in its theoretical focus. Other challenges include difficulty adapting to rapidly changing contexts and practical problems in modelling the theory. While Activity Theory foregrounds the collective systems and mediating artefacts that shape learning, Scaffolding Theory zooms in to examine how learning support is enacted in real-time interactions within these systems.

3.2.2 Scaffolding theory

One of the socio-cultural collaborative learning theories that is most relevant to this research is Vygotsky's Scaffolding Theory. The theory emphasises the social and cultural context in which an individual's learning is shaped, assuming that cognition can be improved through social interaction, cultural artefacts, and tools.

The zone of proximal development (ZPD) is at the core of scaffolding theory. As indicated in Figure 3.1, this concept is visualised as the space between what a learner can do independently and what they can achieve with support. This concept underscores the temporal and adaptive nature of learning support that gradually fades as the learner gains competence. The scaffolding support could come from a faculty member or a more competent peer.

The theory and its concepts are relevant to learning environments that emphasise the nonlinear and context-dependent nature of learning. They help analyse peer scaffolding in collaborative events such as feedback, critiques, and assessments (Lowell & Ashby, 2018; Hou & Keng, 2020;

Shin et al., 2020). Moreover, they support the analysis of interactions in problem-solving learning events (Choi et al., 2005; Xun & Land, 2004).

The limitation of the theory is that it assumes faculty are experienced in identifying students' varying scaffolding needs based on their cognitive abilities. The emphasis on the non-linear and context-dependent nature of learning makes Scaffolding Theory and its concepts particularly relevant within the context of design studios, providing a lens to examine temporal key learning events such as feedback and critiques. Whereas Scaffolding Theory focuses on moment-to-moment interactions within learning events, Actor-Network Theory expands the scope to institutional and infrastructural scales, showing how networks of human and non-human actors sustain or constrain collaborative learning environments.

3.2.3 Actor-Network-Theory

Actor-Network Theory (ANT), developed primarily by Bruno Latour and others, reconceptualises the social by treating human and non-human entities as equally significant actors within a network (Crawford, 2020; Kamp, 2019; Bencherki, 2017; Cressman, 2018). ANT is particularly suited to examining the institutional and infrastructural dimensions of collaboration, where policies, technologies, and artefacts act alongside people to shape educational practice.

The two core concepts of the actor-network theory are the network of influence and assemblages. As the Figure indicates, assemblages are temporal arrangements and links built between actors and actants through practices, emphasising how and what the constituent elements do (process). The other is the network of influence, where the emphasis is on the who and how relationships

might impact the outcomes of interactions (participants). Therefore, ANT may be perceived not as a theory but as a toolkit or a method. This approach makes ANT the most suitable theory for understanding the complex interplay of collaborative culture and cognitive, social, and material networks in learning contexts, providing insights into institutional networks comprising various human and non-human actors, processes, and practices.

The shortcomings of ANT are that it is a non-hierarchical framework, making it difficult to determine which actor is less important or more critical within a collaborative network. In the context of this research, ANT could help unravel the networks an actor may be part of, sometimes making it challenging to know where to stop.

In this research, ANT is the most suitable theory for understanding educational leadership and curriculum development in the context of design schools (Eid & Akella, 2024; Landri, 2023). Its emphasis on networks of both human and non-human actors makes it especially valuable for understanding the dynamics of standards, policies, and reforms in educational institutions (Fenwick, 2011; Fenwick, 2010; Fenwick & Edwards, 2011).

Together, these theories provide a comprehensive analytical lens spanning the micro, meso, and macro dimensions of learning in the design studio.

3.3 Theoretical framework and its core concepts and elements

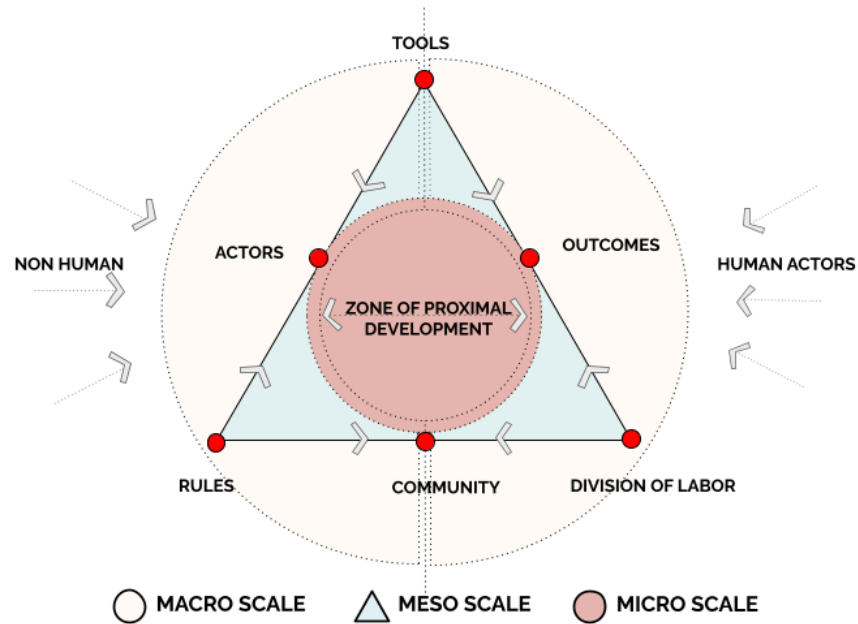


Figure 3.2: Theoretical Framework representation

The multi-level theoretical framework combines the three interrelated theories and, as indicated in Figure 3.2, operates at three scales. The outermost circle is informed by actor-network theory and is used to study the collaborative culture at the design school macro level. The central triangle represents the meso studio scale, which borrows concepts and elements from activity theory and forms the crux of this framework by examining the studio as a site and system for collaborative learning. The innermost circle represents the third and final microscale of the framework, informed by scaffolding theory, which operates at the level of a series of small collaborative learning events that might occur in a studio. This multi-level framework will provide the structure for the research analysis and contribute towards building the learning framework for collaborative sites and systems for learning in Studio Pedagogy.

3.2.1 Key Theoretical Concepts

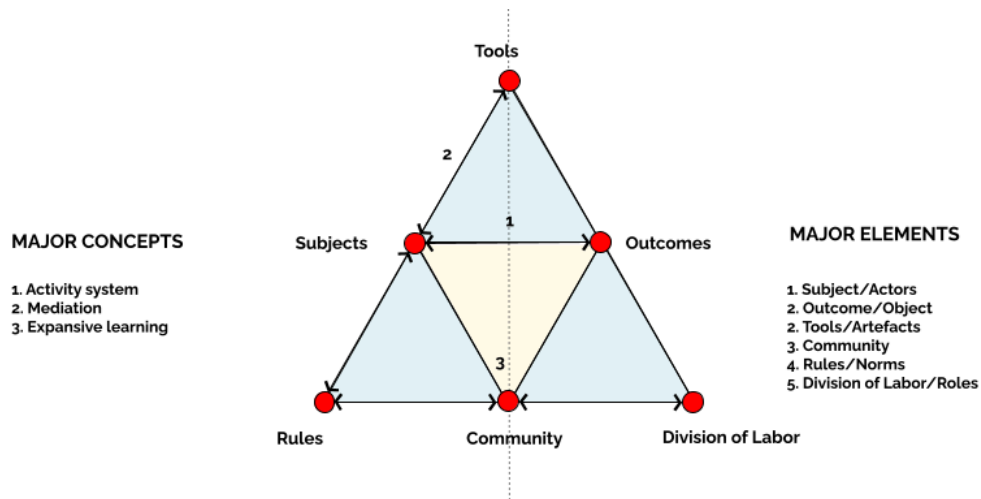


Figure 3.3: Activity theory contributing concepts and elements

At the studio (meso) level, the framework applies concepts from Activity Theory to understand collaborative action. The activity system is the primary unit of analysis, encompassing the subjects or actors (students and faculty), the objectives, and the system's components. In a studio setting, this involves identifying:

- Actors involved (students from varied disciplines, facilitators' backgrounds)
- Goals (both stated and implicit, such as those in lesson plans or project briefs), and
- Outcomes (student projects, as well as cognitive and communicative skills developed).

The concept of **mediation** explains how tools such as digital platforms, design artefacts, or pedagogical strategies shape engagement and influence outcomes. In the studio context, this could include assignment structures, collaborative critiques, or the use of shared digital spaces.

The final concept, **expansive learning**, describes how student teams collectively develop new ways of working in response to challenges within the activity system. This often involves redefining rules, redistributing roles, or negotiating norms of collaboration. In the studio, this

might manifest as emergent team dynamics or self-organised strategies that respond to contradictions and tensions inherent in the learning process.

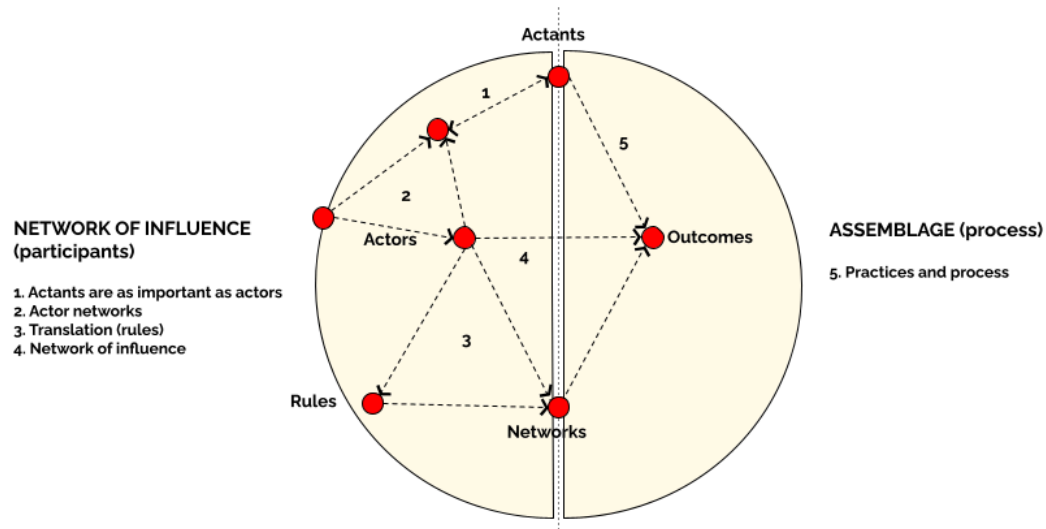


Figure 3.4: ANT contributing concepts and elements

At the institutional (macro) level, the framework draws on Actor-Network Theory to interpret how networks of human and non-human actors shape collaborative cultures. The concept of actors/actants helps identify how non-human elements, such as curriculum design, digital infrastructure, or vertical studio structures, impact the system, comparable to human actors like students or faculty.

Actor networks are formed through these relationships, connecting students, teachers, administrators, and technologies. The concept of **translation** captures how these actors negotiate, align with, or transform each other's roles and goals, for instance, through practices such as student clubs or interdisciplinary initiatives. The concept of a **network of influence**

helps define who interacts with whom, and how, over time. For example, the actor networks are dismantled once the studio is complete.

Finally, **assemblages** refer to the temporary configurations through which these actors work together to achieve institutional outcomes such as exhibitions, juries, or shared events. Informed by the principle of **heterogeneity**, the framework examines how such networks of people, artefacts, and systems continuously interact and reshape collaborative learning habits and environments.

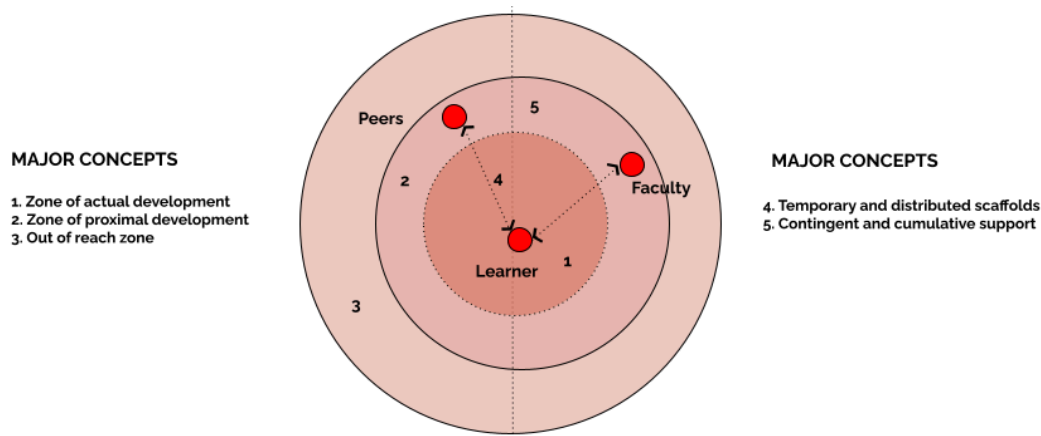


Figure 3.5: Scaffolding theory contributing concepts and elements

The framework draws on scaffolding theory to help observe collaboration at the level of the learning event. As indicated in Figure 3.5, the **Zone of Actual Development** represents what a student can achieve independently at the studio's outset. The **Zone of Proximal Development** describes the enhanced learning attainable through peer and faculty support.

Temporary and distributed scaffolds are basically how the faculty strategically decides what aspects of the studio need to be done through teamwork versus individually. **Contingent and cumulative supports** are where the faculty chooses at what stages to intervene in the learning

process with a master class or a feedback session. These concepts help assess the dynamic processes through which students learn collaboratively, building both independence and interdependence as the studio progresses.

3.3 Alignment of the framework with objectives and questions

The following figures illustrate how the framework helps address this research's objectives and questions. Though the research questions could be addressed at multiple scales, they are aligned with the most appropriate scales.

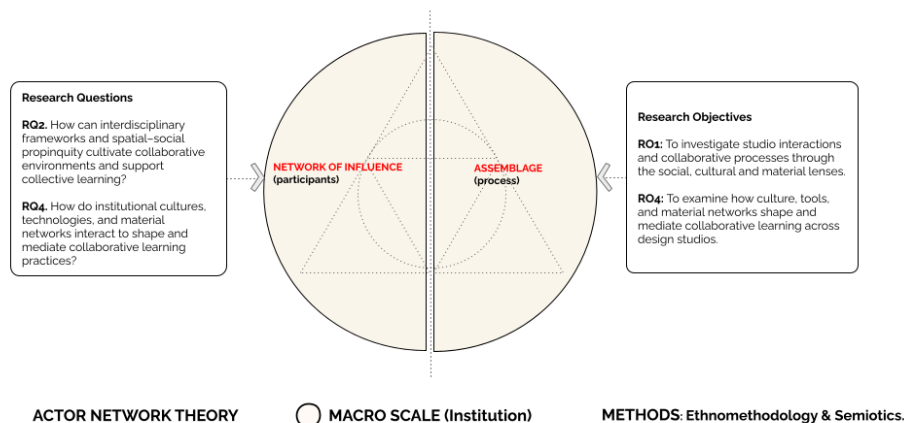


Figure 3.6: Theoretical Framework at the Institution scale

At the institutional (macro) scale, the research examines how ethics-centred pedagogies and curricular reforms can address the critiques of design studio pedagogy. This level also considers how incorporating collaborative, project-based learning may enhance interdisciplinarity within design schools. Concepts from Actor-Network Theory (ANT) examine how social, cultural, and material elements — such as policies, institutional structures, and technologies — mediate and sustain collaboration.

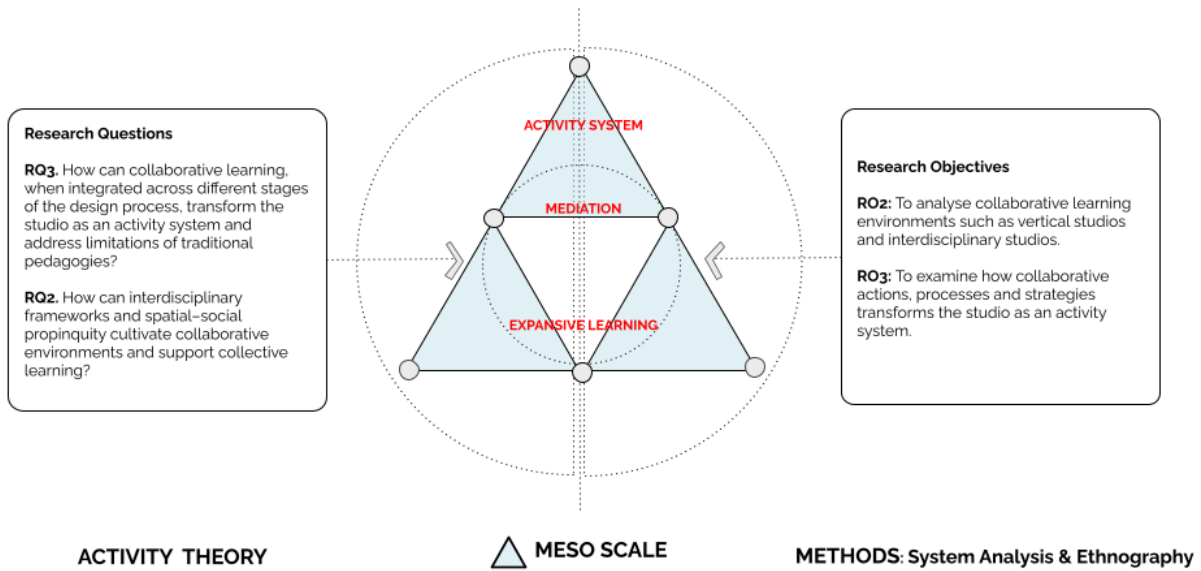


Figure 3.7: Theoretical Framework at Studio scale

At the studio (meso) scale, the research investigates how collaborative learning can improve design pedagogy and how context-based studio practices influence learning. Drawing on Activity Theory (AT), this level analyses studio-level actions, objects, tools, and mediating artefacts. The framework helps identify tensions, rules, and divisions of labour that shape collaborative engagements within vertical and interdisciplinary studio environments.

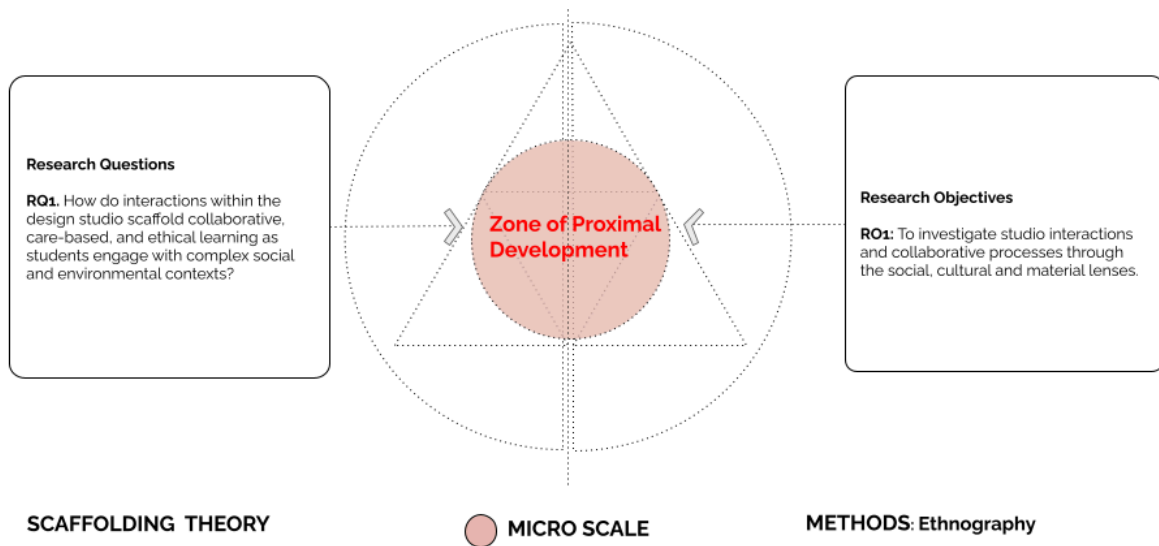


Figure 3.8: Theoretical Framework at Learning Event Scale

The framework focuses on specific moments of collaboration at the learning event (micro) scale. Concepts from Scaffolding Theory inform this analysis, particularly the Zone of Proximal Development and the design of temporary, distributed supports. This helps reveal how faculty and peers co-construct learning experiences through adaptive and responsive interventions.

In summary, this multi-level theoretical framework establishes the following:

- **Epistemologically**, the research is grounded in a *constructivist and socio-cultural* understanding of learning.
- **Ontologically**, it acknowledges *multiple realities* within Indian design education.
- **Methodologically**, it employs qualitative and mixed-methods approaches to capture the complexity of learning across scales.
- **Empirically**, it operationalises these perspectives through *interviews, surveys, and observations*.

Bringing together Scaffolding Theory (at the level of the learner), Activity Theory (at the level of the studio), and Actor–Network Theory (at the institutional level) creates a coherent framework for this study. Together, these perspectives help address the key gaps identified in the literature—the absence of strong interdisciplinary structures, and the limited theorisation of the studio as a space for structured collaboration. This multi-layered lens helps view the studio both as a physical site of learning and as a living system where collaboration is central to learning.

3.4: Defining key terms

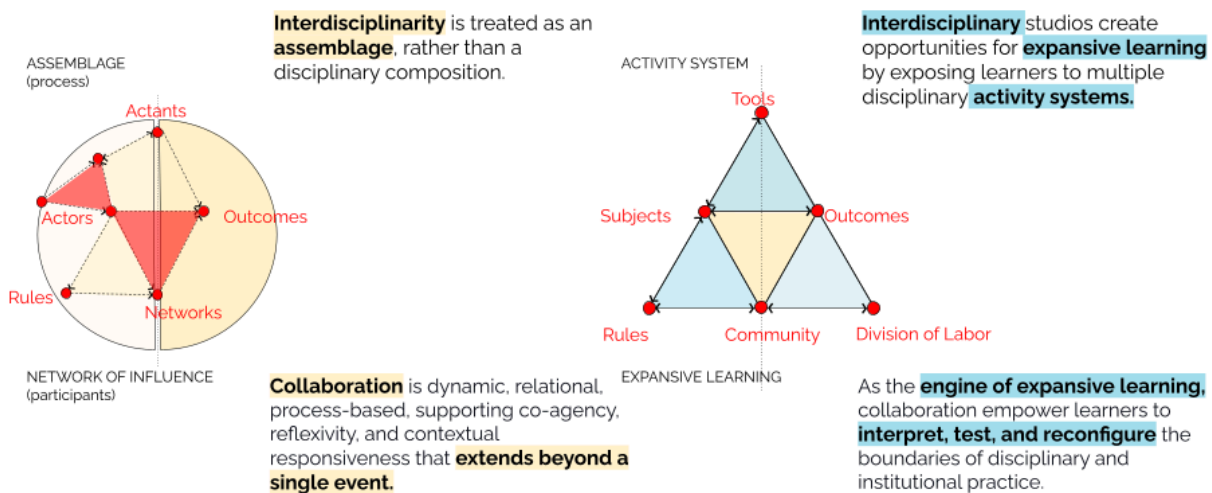


Figure 3.9: Key Terms in the analysis

The Figure above synthesises how interdisciplinarity and collaboration can be understood within activity systems and assemblages.

Defining Interdisciplinarity (Activity theory+ANT)

Within this theoretical framework, interdisciplinarity is understood as a relational and process-based construct rather than a fixed disciplinary composition. It takes shape through

shared tools, artefacts, and institutional processes such as collaborative studios, exhibitions, project-based learning, and student-led initiatives that enable exchanges across disciplines. Interdisciplinary learning in the studio is closely linked to the broader institutional and social ecologies in which it operates. The ways students encounter and engage with other disciplines outside the studio significantly influence how they collaborate within the studio.

At the institutional level, the focus is therefore not on comparing disciplinary epistemologies or curricular content, but on understanding how institutional structures, technologies, and practices enable or constrain interdisciplinary collaboration and learning.

Interdisciplinary studios create opportunities for expansive learning by exposing students to multiple disciplinary activity systems. The tensions and contradictions between these systems become spaces for negotiation and innovation. Here, interdisciplinarity involves the co-creation of a shared object, a design problem or a project, mediated by tools, artefacts, and social interaction.

Vertical studios, on the other hand, foster peer scaffolding across levels of expertise. They distribute learning responsibilities and encourage reflective, care-based collaboration. Together, these studio formats: interdisciplinary and vertical studios, provide vibrant environments for collaborative learning.

Defining Culture (Geertz + Activity Theory)

To establish how this research understands culture, it draws on Geertz's idea of culture as a system of shared symbols and meanings, which is particularly useful for understanding studio environments. In a design studio, "symbols" take the form of tools, learning artefacts, studio

routines, values, and the everyday ways students and faculty interact. Just as people interpret cultural symbols to make sense of the world, students and teachers interpret these shared cues to understand how learning is expected to happen.

Geertz's notion of thick description encourages us to look beyond visible classroom actions and pay attention to their underlying meanings—why students take on specific roles, how teams negotiate decisions, or why particular styles of critique dominate. Activity Theory complements this interpretive lens by offering a structured way to examine these actions: the tools involved, the rules that shape behaviour, the community that participates, and the shared objects students work toward.

Both perspectives emphasise that culture is dynamic rather than fixed. It evolves through everyday interactions, negotiations, and contradictions. In the studio, this appears in the shifting roles within teams, informal norms students develop, and the microclimates created by different faculty styles. Activity Theory helps make sense of these dynamics by tracing the relationships among artefacts, division of labour, rules, and community. The contradictions between them—such as valuing collaboration while the grading system rewards individual output—show where studio culture becomes strained. These tensions are not failures but points where adaptation and transformation become possible.

Seen together, Geertz and Activity Theory frame culture not as a backdrop but as something actively produced through everyday practice. This provides a strong lens for understanding why collaborative learning succeeds or struggles within different studio settings.

Defining Collaboration (Activity+ANT+Scaffolding Theory)

Within this framework, collaboration is seen as a dynamic, relational, and ongoing practice rather than a single event. It is marked by co-agency, reflexivity, and contextual responsiveness among participants. Collaboration enables multi-voiced participation and the creation of shared objects within an activity system. As the driving force of expansive learning, it allows learners to test, interpret, and reconfigure the boundaries of disciplinary and institutional practice.

Emerging through interactions among people, tools, and systems, collaboration transforms the studio itself into a living, evolving activity system. Rather than treating collaboration as a value or outcome, this study views it as a process of assembling and aligning interests.

In this research, collaborative practices are understood as the situated and material activities through which diverse human and non-human actors: students, faculty, institutional systems, tools, and technologies, coordinate, negotiate, and co-produce learning within the design studio.

The Studio as a complex evolving system

Bringing together the theoretical perspectives discussed in this chapter, the design studio is conceptualised not just as a pedagogical tool but as a complex, evolving system. Drawing on Activity Theory, Scaffolding and ANT, the studio is understood as a dynamic configuration of people, tools, rules, spatial configurations, artefacts, values, and institutional structures. These elements interact continuously to shape how collaborative learning is initiated, sustained, and transformed. Such a systems view acknowledges that collaborative learning does not arise from any single intervention. Tools and artefacts mediate action. Institutional structures shape cultural norms. This perspective of the studio as a system and a site serves as the basis for the research

methodology discussed in the next chapter. It justifies the need for a layered, mixed, and iterative methodological approach, capable of capturing collaborative learning as it unfolds across multiple levels: individual, group, studio, and institutional.

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