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Commercial Logic and Structural Mismatches in Child-Centred Design for Chinese Children's Art Training Centres

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ABSTRACT

Commercial children's art training centres have expanded rapidly across urban China, yet interior design research has paid limited attention to these hybrid spaces. Existing scholarship has concentrated mainly on kindergartens, primary schools and museum learning environments. This article argues that the gap is not simply empirical, but theoretical: commercial art training spaces are produced through retail real-estate logic, storefront visibility, replicable fit-out templates and fee-paying parents' aesthetic expectations, all of which can systematically reshape the conditions under which child-centred design is interpreted and implemented. Drawing on Piaget's theory of cognitive development, Vygotsky's account of environment as a learning scaffold, Erikson's theory of socio-emotional development, Gibson's theory of affordance, Maslow's hierarchy of needs and Bronfenbrenner's ecological systems model, the article develops a six-part analytical framework for child-centred spatial design. It then identifies five forms of structural mismatch between this framework and the commercial production of children's art training spaces. These mismatches are treated as predictable effects of commercial constraints rather than as the failures of individual designers, institutions or parents. The article further proposes a mixed-methods empirical strategy through which the framework can be tested in future field research. Its contribution is threefold: it clarifies the theoretical content of child-centred design in commercial educational environments; it explains how commercial logic becomes a constitutive variable in spatial production; and it advances the concept of market-aware child-centred design as a basis for future design research and practice.

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1. INTRODUCTION

Commercial children's art training centres have become a familiar part of the urban educational landscape in China. Rising household spending, parental demand for educational advantage and policy attention to creativity and aesthetic education have supported the sector's growth (Liu et al., 2022; Wang et al., 2025). What was once a relatively small category of after-school activity has become part of the everyday routine of many children.

Interior design research has not kept pace with this expansion. Most studies of children's learning environments continue to focus on kindergartens, primary-school classrooms and museum learning spaces (Parnell & Patsarika, 2011), while a smaller body of work examines therapeutic or inclusive environments for children with special needs. Commercial, informal art training spaces occupy an ambiguous position between retail premises and educational centres, and this position has left them comparatively under-theorised.

This absence matters because commercial art training centres are not produced through the same spatial assumptions as the settings most often examined in the literature. Public kindergartens and schools are normally required to meet minimum standards for area, daylight, ventilation and outdoor access (Rao et al., 2023). By contrast, commercial art training centres are frequently inserted into existing commercial shells, including street-front shops, ground-floor residential units and converted office floors, none of which were originally designed around children's spatial experience (Gao et al., 2021). Their planning is shaped by rent per square metre, storefront visibility, chain-brand consistency and the aesthetic judgement of paying adults. The result is an educational environment whose physical shell is repeatedly organised by the retail property market rather than by pedagogical need.

The central argument of this article is that commercial real-estate logic can conflict with child-centred design in stable and predictable ways. The problem is structural rather than personal. Designers commissioned to work on these spaces

may be skilled and well intentioned, but the building shell, rent pressure and marketing objectives they inherit are converted into spatial conditions before design principles can be applied. This argument also speaks to broader discussions of lifelong education and inclusive learning, because commercial art training centres are becoming significant sites of out-of-school learning. Whether such learning is genuinely inclusive depends not only on curriculum or teaching method, but also on whether the physical environment is organised around children or around the adult market that pays for access to them.

2. METHOD

This article is a conceptual paper based on critical literature review and theoretical synthesis rather than new empirical data collection (Jaakkola, 2020). Conceptual work of this kind is appropriate when the aim is not to test a hypothesis immediately, but to clarify a problem, specify its theoretical structure and prepare categories for future empirical research.

The analysis proceeded in four steps. First, literature in child development, environmental psychology and interior design was reviewed to identify theoretical traditions that are repeatedly used in studies of children's spatial environments. The selected theories met two criteria: they have an established role in research on children and space, and they generate clear spatial implications for learning environments. Second, these theories were integrated into a holistic account of child-centred design, understood as a set of joint conditions rather than as a list of independent principles.

Third, literature on urban commercial space, shop conversion and the production of space was used to examine how commercial real estate shapes the spatial production of children's art training centres. Particular attention was given to two common building shells in this sector: street-front commercial units and ground-floor residential units. Fourth, the child-centred framework and the commercial logic were compared in order to identify recurrent structural mismatches. A mismatch was included only when it met two conditions: it could be plausibly traced to commercial constraints rather than to an isolated design preference, and it conflicted with at least one component of the child-centred framework.

This method has a clear but limited purpose. It can show that the proposed structural mismatches are theoretically coherent, internally consistent and grounded in existing research. It cannot, by itself, establish how frequently those mismatches occur across the sector. For that reason, the article concludes by proposing a convergent mixed-methods research design (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2003) through which the framework can be tested in specific field contexts. The conceptual framework and the empirical strategy should therefore be read together: the framework defines what future studies need to observe, measure and compare.

3. RESULTS AND DISCUSSION

The analysis produces three linked outcomes. First, it develops a six-part theoretical view of child-centred spatial design. Second, it explains how commercial logic shapes the spatial production of children's art training centres. Third, and most importantly, it identifies five categories of structural mismatch between these two logics. The discussion then considers what this explanation contributes to interior design theory and practice, and what kind of empirical research would be required to test it.

3.1 Six Theoretical Foundations of Child-Centred Spatial Design

Child-centred spatial design is often invoked as a general aspiration, but in design research it rests on several distinct theoretical traditions. Before commercial constraints can be analysed, the content of child-centred design must be made explicit. Without such clarification, the claim that commercial logic distorts child-centred design would remain too broad to be useful.

3.1.1 Piaget: cognitive stages and spatial fit

Piaget (1952) understands cognitive development as a sequence of qualitative changes in ways of thinking, and this remains one of the earliest foundations for child-centred spatial reasoning. Children in the preoperational stage, approximately two to seven years old, tend to rely on intuitive, perceptually dominated and egocentric forms of thought; they therefore read space through concrete and easily recognisable cues (Asokan et al., 2014). Art classrooms for this age group should use warm, legible colour signals, simple graphic symbols and low cognitive-load zoning. Children in the concrete operational stage, approximately seven to eleven years old, begin to develop logical reasoning in relation to concrete material. Spatial design for this group can therefore move from intuitive guidance towards functional independence, flexible layouts, multi-angle work areas and spaces for shared problem-solving (Bluteau et al., 2022). A single fixed spatial template cannot serve children aged three to twelve equally well. Child-centred design therefore requires age-sensitive zoning at the level of the studio plan.

3.1.2 Vygotsky: the environment as a learning scaffold

Vygotsky's sociocultural theory treats cognitive development as a social and cultural process (Vygotsky, 1978). The zone of proximal development describes the distance between what children can do independently and what they can do with the assistance of peers or teachers. In design research, this idea supports the view that the physical environment can operate as a scaffold for social learning (Robson & Mastrangelo, 2018). In an art studio, this implies that conventional rows of desks inherited from classroom layouts are insufficient. Shared worktables, interactive drawing walls, communal material stations and reconfigurable furniture are spatial equivalents of scaffolded interaction. In smaller Chinese cities and other collectivist learning cultures, the need for frequent group

interaction may be stronger rather than weaker, because children's emerging artistic identity is also partly a shared cultural identity (Zhu & Li, 2020).

3.1.3 Erikson: emotional security and spaces of recognition

Erikson's eight-stage model highlights the socio-emotional tasks associated with different phases of childhood (Erikson, 1950). For preschool children, the spatial implication is the removal of physical risk: rounded furniture, non-slip and non-toxic materials, soft lighting and a sense of enclosure at children's scale (Amissah-Essel et al., 2020). For school-age children, the implication is that children should be able to see their work being seen and valued (Eckhoff, 2019). Visible displays of children's artwork, dedicated recognition walls and gallery-like displays positioned at children's eye height are not merely decorative. They are part of a recognition environment through which the room itself affirms children's developing competence.

3.1.4 Gibson: affordance as silent pedagogy

Gibson's ecological theory of perception argues that environments carry behavioural information directly through their physical properties, without requiring verbal instruction (Gibson, 1979). A transition from hard flooring to soft carpet, for example, can signal a change in expected behaviour without explanation. In an art studio, this means that the room itself can function as a form of silent pedagogy. Changes in floor material can create quiet zones, low-saturation cool colours can support concentration, high-saturation warm colours can support shared energy, and material variation can invite hands-on exploration (Deng et al., 2024). Because children may be particularly responsive to subtle environmental cues (Pluess & Belsky, 2013), the quality and coherence of affordance are central to children's spatial experience.

3.1.5 Maslow: hierarchical needs in physical space

Maslow's hierarchy of needs has been adapted in design theory as a bottom-up diagnostic tool (Maslow, 1943). Lower-level physiological and safety needs form the foundation: glare, formaldehyde, sharp corners, excessive heat or cold and poorly matched furniture can trigger defensive responses and undermine higher-level creative activity (Winterbottom & Wilkins, 2009; Caciora et al., 2024; Castellucci et al., 2010). Higher-level needs, including belonging, esteem and self-actualisation, require the studio to operate not only as an instructional room but also as a social and representational space in which children can see themselves as members of a creative community. A Maslovian reading of child-centred design is therefore hierarchical. Designing for self-expression is insufficient if basic comfort and safety are unstable; yet meeting basic needs alone is also inadequate if the space offers no belonging or recognition. This article recognises that Maslow's model is grounded in Western individualist assumptions, and that belonging and social recognition may carry particular weight in the collectivist cultural settings considered here. Even so, the hierarchy remains useful as a diagnostic framework for examining whether a space supports both foundational and higher-order needs.

3.1.6 Bronfenbrenner: the studio as a microsystem of daily life

Bronfenbrenner's ecological systems model locates children within nested environmental levels, including microsystem, mesosystem, exosystem and macrosystem (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998). The microsystem, the immediate physical and social environment of daily life, is where external forces become proximate to the child. For child-centred spatial reasoning, this has two implications. First, the studio shell is not a passive container; it is an active medium through which the property market, educational policy and parental expectations reach children's everyday bodily experience. Second, the stability and predictability of the microsystem matter developmentally. A microsystem interrupted by unsafe transitions, confusing circulation or persistent background noise is not merely a local design problem, but a system-level problem.

3.1.7 A six-part synthetic view

Taken together, these six foundations suggest that child-centred spatial design should be age-sensitive, scaffolded, recognitional, affordance-rich, hierarchically responsive and ecologically embedded. These are not separate checklist items, but mutually supporting conditions. A studio cannot be described as child-centred if it satisfies one component while undermining another: weak physiological comfort can neutralise the benefits of Vygotskian group layout, and the absence of Eriksonian recognition can weaken the developmental support that Piagetian age zoning is intended to provide. The synthetic framework should therefore be understood as a set of joint conditions. Figure 1 presents this view, with child-centred spatial design at the centre and six theoretical anchors surrounding it. It is against this integrated framework that commercial spatial production is examined.

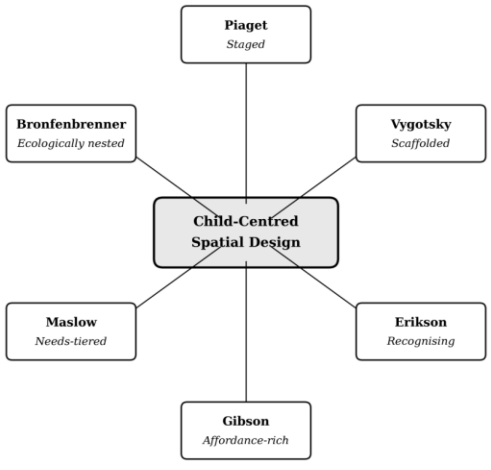


Figure 1
Six-anchor synthetic framework for child-centred spatial design.

3.2 Commercial Logic in the Production of Space

Public kindergartens and schools are usually built within educational policy frameworks and must meet minimum standards for area, daylight, ventilation and outdoor access. Commercial children's art training centres are produced through a different retail property logic. Lefebvre's account of the production of space reminds us that space is not the neutral outcome of individual design decisions, but the materialisation of economic and social forces (Lefebvre, 1991). In the present context, this means that the mismatch between commercial studios and child-centred design should be understood as the predictable result of a production logic never organised around children's spatial needs. Five structural features are especially significant.

3.2.1 Rent pressure and area calculation

Operators lease space at commercial rents and must recover these costs through tuition fees. This calculation encourages centres to maximise fee-generating use per square metre: larger classes, denser schedules and the reduction of areas that do not directly produce income. Corridors, entrance buffers, calming corners, child-scale storage and quiet retreat spaces, all of which are valued in child-centred spatial literature (Aminpour et al., 2025), are vulnerable because they occupy floor area without generating tuition. The result is a persistent compression of children's spatial experience. Studio area is not determined primarily by children's needs, but by what remains after rent has been calculated.

3.2.2 Storefront visibility and enrolment-oriented signage

In a competitive enrolment market, the storefront becomes a major recruitment device. Operators often prefer high-footfall locations with large glass facades, illuminated signage and visually busy entrance zones (Oh & Petrie, 2012). These features can attract new students, but they also produce sensory conditions that the affordance and hierarchy-of-needs literature would regard as problematic: heat gain, uneven glare, visual pull from the street and uncontrolled noise. The design choices that make a centre visible to prospective customers can therefore reduce the sensory quality of the interior learning environment.

3.2.3 One template across multiple branches

Chain organisations often develop standard design templates that can be replicated quickly across branches, reducing design costs and stabilising brand image. Replication can support expansion and procurement efficiency, but it can also inhibit the local responsiveness valued in Vygotskian and Bronfenbrennerian perspectives: attention to local cultural cues, differences among leased shells and the actual characteristics of children enrolled in each city (Grêt-Regamey & Galleguillos-Torres, 2022). When a child enters a chain-template studio in a smaller city, the space may have been calibrated more for adult-readable brand recognition than for fit with the child's local cultural world.

3.2.4 Designing for fee-paying parents

The people who pay for art classes are parents, not children. Marketing photographs, reception areas, award walls and stylised decorations therefore tend to address adult taste and adult concerns about whether the course appears worthwhile. Wall surfaces, lighting in reception areas, colours and visible materials are used to signal professionalism, modernity and taste to adults. This article refers to this tendency as adult aesthetic capture: the tendency of commercial children's spaces to prioritise the visual preferences of fee-paying adults over the spatial needs of child users. Even when a centre claims to serve children, its spatial shell can drift towards the appearance of adult consumption space (Cryer & Burchinal, 1997). Adult aesthetic capture is a structural force rather than a single poor decision, because marketing incentives repeatedly reward adult-readable quality signals and displace child-readable signs of welcome.

3.2.5 Two common building shells

The sector commonly uses two types of building shell. The first is the street-front commercial unit, characterised by pedestrian visibility, large glass walls, an open commercial shell and exposure to street noise. The second is the ground-floor residential unit, where load-bearing walls divide the plan, ceiling heights may be low and noise limits are shaped by the need to protect residents above. Each shell transfers a specific set of architectural constraints to operators. Their responses are therefore not free design choices, but compromises made within a shell originally built for other users. Literature on purpose-built schools can help only partially, because it often assumes a plan drawn from the beginning for children, policy-based minimum area per child and a relationship with outdoor space. Commercial art training spaces begin from a very different physical premise.

3.3 Five Categories of Structural Mismatch

Once the child-centred framework and the commercial logic have been specified, five categories of structural mismatch become visible. Each category is a predictable translation of commercial logic into the building shell, and each conflicts with one or more components of child-centred design. The list is not exhaustive, but it identifies the most significant recurring patterns. Table 1 summarises the commercial pressure behind each mismatch, the spatial outcome produced in the studio and the theoretical component of child-centred design that is disrupted.

Table 1

Five structural mismatches between commercial spatial production and child-centred design.

No.	Mismatch pattern	Commercial driver	Spatial outcome	Disrupted theoretical component
1	Vertical bottleneck	Higher rent at ground level and lower rent on upper floors	Stairs become part of everyday circulation; shared corridors; adult-scaled steps	Bronfenbrenner: stable microsystem
2	Sensory instability	Storefront visibility used for enrolment	Glass walls, street noise and uneven daylight across the day	Gibson: affordance; Maslow: foundational needs
3	Adult aesthetic display	Parents are the fee-paying decision-makers	Walls used for branding, marketing photographs and adult eye-level decoration	Erikson: spaces of recognition
4	Fixed structural partitions	Reuse of ground-floor residential units	Load-bearing walls divide the plan into domestic-scale rooms	Vygotsky: reconfigurable space within the zone of proximal development
5	Adult-scaled furniture	Lower cost, longer durability and easier resale at the end of a lease	Adult-height desks, chairs and sinks; storage beyond younger children's reach	Piaget: proportion and scale

Note. Each mismatch is treated as a structural pattern rather than as an individual designer's mistake. The commercial pressure identified in the third column sits upstream of the designer's immediate control; the disrupted theoretical components in the fifth column are drawn from the six-part framework in Section 3.1.

3.3.1 Vertical bottlenecks and the stable microsystem

When a multi-storey commercial space is converted into an art training centre, the economics of the building often place the highly visible reception or display area on the ground floor while pushing teaching rooms upstairs, where rent per square metre is lower. For children, the everyday consequence is that stairs become a routine part of each visit. From a Bronfenbrennerian perspective, this is not a neutral spatial arrangement. It is the process through which price differences between floors are written into children's bodily experience. Steep adult-scaled steps, narrow handrails positioned at adult shoulder height and visually confusing shared corridors can undermine the stable microsystem that development requires. The child does not encounter a coherent immediate environment, but a repeatedly interrupted sequence between building layers that were not planned as one educational setting. The transition from street to studio, one of the most formative moments of every visit, is therefore shaped less by children's need for orientation, safety and gradual adjustment than by commercial visibility.

3.3.2 Glass walls, street noise and unstable affordance

Gibson's theory of affordance assumes that the cues children read in a room should communicate stable and legible behavioural signals. Commercial storefront design can conflict with this requirement. Large glass walls create highly variable daylight: direct morning sun, afternoon glare and deep shadow on cloudy days. This instability weakens the colour and lighting cues on which affordance-based zoning depends. A floor-material transition intended to mark the boundary between an active making zone and a quiet reading corner can lose clarity when light conditions change across the day. Street noise from nearby shops, vehicles and pedestrians can also enter the studio and overwhelm the cues associated with quiet areas. The overall result is reduced legibility. Because children may be more sensitive than adults to subtle physical cues (Pluess & Belsky, 2013), this instability can be especially consequential. The facade that draws children into the centre can simultaneously weaken the silent pedagogy that the interior should provide.

3.3.3 Adult aesthetic display and Eriksonian recognition

Wall area is scarce in commercial studios. From an Eriksonian perspective, especially for children aged seven to twelve, these surfaces should allow children to see their own work displayed and thereby encounter daily evidence of growing competence. Commercial logic reverses this priority. The same wall area has economic value as a surface for marketing photographs, brand awards, motivational slogans and stylised adult-oriented decoration that reassures visiting parents about teaching quality and brand status. Even when children's work is displayed, it may be selected, framed and positioned by adults at adult eye height, turning what should be an everyday recognition system into an occasional performance for parents. At precisely the age when the room should help children feel seen, the spatial message shifts towards reassuring adults. The wall changes from a medium of socio-emotional growth into a tool for sustaining enrolment.

3.3.4 Fixed walls and Vygotskian reconfiguration

A Vygotskian approach requires the social organisation of the studio to change with the task: individual practice, small-group collaboration, whole-class instruction and peer critique all require different spatial arrangements. Movable furniture, flexible partitions and open plans are design tools that support this variation. Ground-floor residential units, however, carry load-bearing walls from the original

domestic plan. These walls divide the studio into fixed domestic-scale rooms rather than teaching-scale zones (Grêt-Regamey & Galleguillos-Torres, 2022). Social organisation is partly locked at the level of the inherited residential layout. Even if movable furniture is purchased, it sits within a plan whose structural walls already limit reconfiguration. A teacher may move chairs in order to shift from a six-person group table to a twelve-person critique, but the wall cannot be moved. The zone of proximal development requires a space flexible enough to support changing forms of interaction; the leased shell can block that flexibility at the structural level.

3.3.5 Cost-driven adult-scale furniture and children's ergonomics

Furniture is one of the clearest sites of mismatch. The mechanism is straightforward: operational cost calculation produces procurement decisions that are not centred on children's ergonomics, and resale value at the end of a lease reinforces this preference. Standard adult desks and chairs have a second-hand market; custom child-height furniture has a narrower resale audience and must be replaced or supplemented as children grow. This economic calculation occurs before any child enters the room, yet it determines the ergonomic conditions of every class. Adult-scale furniture is cheaper to buy, longer-lasting, easier to resell and easier to standardise across branches. Child-scale furniture requires customisation, age-group differentiation and more complex stock management. Under cost-allocation logic, operators can be expected to prefer adult-standard products, often assuming that older children can adapt and younger children can be accommodated with cushions or footrests. The result is consistent with the ergonomic literature (Castellucci et al., 2010; Parnell & Patsarika, 2011): display walls sit at the wrong sightline, oversized chairs compromise posture during long drawing sessions, sinks are set at adult reach height and storage is inaccessible to younger children. Children's bodies are asked to fit inherited facilities, and everyday artistic practice takes place within a posture that may be uncomfortable in the short term and harmful over time.

3.3.6 Structural, not personal

These five mismatches should not be read as accusations against individual designers. Each represents a predictable structural transfer from commercial logic into children's bodily experience. They recur because the upstream pressures recur; as long as those pressures remain, even well-intentioned designers will encounter them repeatedly. Treating these patterns as individual mistakes misreads the level at which causation operates, and such a misreading leads to solutions aimed at the wrong level. This is why market-aware child-centred design is needed. If design theory cannot name these structural patterns accurately, it cannot address them effectively.

3.4 Discussion: Implications for Theory and Practice

3.4.1 Towards market-aware child-centred design

Interior design theory often treats child-centredness as a set of principles that can be applied to a space. The structural account developed here suggests that, in commercial contexts, the possibility of application may already be constrained before the designer arrives. A theory of market-aware child-centred design should therefore treat upstream pressures, including rent levels, storefront economics, template replication and adult aesthetic capture, as part of the design problem itself rather than as external obstacles to be lamented. Such a theory reframes designers as practitioners working within inherited shells rather than as free agents applying principles to neutral containers. It also helps identify the limited but meaningful points at which designers may resist, negotiate with or redirect commercial logic.

3.4.2 Design practice: working with the shell

For designers commissioned to adapt commercial children's art training spaces, the argument changes the task. Kindergarten literature often assumes a purpose-built shell with policy-based area standards, and is therefore only partly transferable. In commercial settings, designers need techniques for working with the shell: noise and glare mitigation for glass facades, circulation corrections for stair bottlenecks, adaptive strategies for fixed structural partitions and wall-use rules that protect children's artwork from adult aesthetic capture. Design competence in this field is therefore not only decorative. It is closer to architectural negotiation with inherited constraints, and to the careful allocation of limited spatial resources under commercial pressure.

3.4.3 A mixed-methods empirical research agenda

The theoretical critique proposed here requires empirical testing, and such testing cannot rely on one method alone. Measuring architectural features would not capture the sensory and emotional experience addressed by Gibson, Erikson and Maslow. Field ethnography alone would not show whether the observed patterns are widespread across the sector. A convergent mixed-methods design is therefore appropriate (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2003). Surveys, semi-structured interviews with stakeholders and on-site behavioural observation can be conducted in parallel and then compared. The six theoretical components can be operationalised as six measurable design dimensions: visual environment, spatial layout, physical facilities, emotional support, behavioural affordance and social collaboration. These dimensions can be cross-measured through the three instruments to build a matrix that links building conditions, stakeholder perspectives and observed children's behaviour. Sampling should use maximum variation logic (Patton, 2002), selecting centres from the two main shell types because the type of constraint is itself part of the research question. Qualitative sample size should be guided by theoretical saturation rather than statistical power (Fusch & Ness, 2015; Guest et al., 2006), while quantitative sample size should be determined according to the requirements of regression analysis. Figure 2 presents the proposed research structure, moving from theory to operationalisation, parallel data collection, comparison and empirical testing of the five structural mismatches. This design would allow researchers to examine whether the patterns identified here are sector-wide structural tendencies or limited to particular cases.

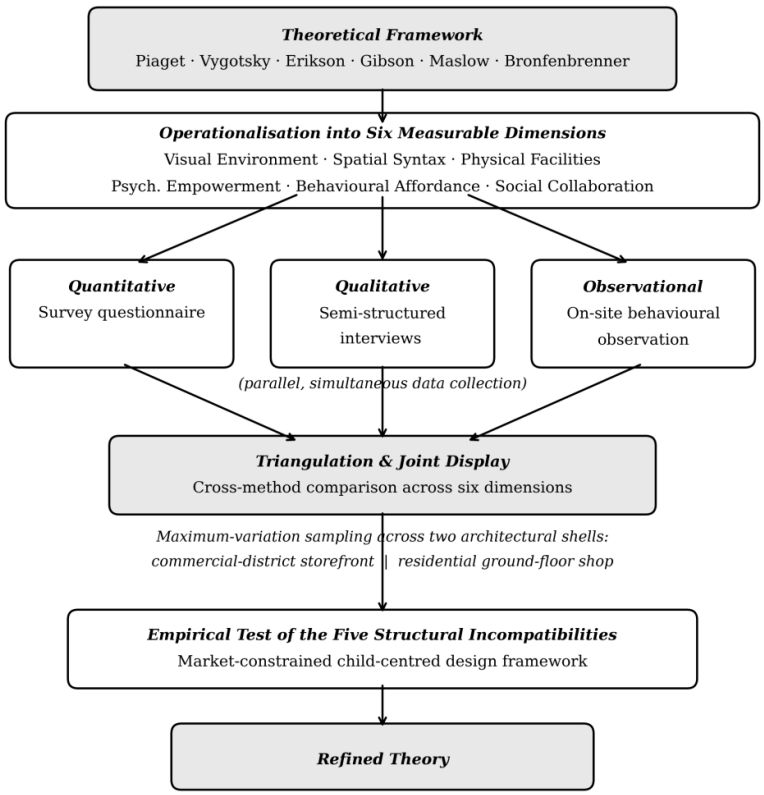


Figure 2

Convergent mixed-methods framework for empirical testing.

4. CONCLUSION

This article has argued that the limited attention given to commercial children's art training spaces in interior design research is not merely a small empirical gap, but a symptom of a larger theoretical problem. Existing research on child-centred learning environments has usually taken purpose-built or institutionally regulated spaces, such as kindergartens, primary schools and museum learning environments, as its reference points. In those settings, the physical shell is often assumed to be broadly aligned with educational purposes. Commercial art training centres disrupt that assumption. Functionally, they are learning environments; in ownership, leasing logic, branding and evaluation, they are commercial spaces. This difference changes the conditions under which child-centred design can be applied.

The main theoretical shift proposed by this article is to move child-centred design away from a set of principles applied to neutral spatial containers and towards an analytical framework that also explains how the container itself is commercially produced. The six-part framework developed here suggests that child-centred spatial design depends on age-sensitive zoning, scaffolded interaction, emotional recognition, legible affordance, hierarchical needs and a stable microsystem. The article also argues that these conditions are repeatedly interrupted by rent pressure, storefront visibility, standardised chain templates, parent-facing display logic and the reuse of building shells not designed for children. Its contribution is therefore not simply to restate what children need from space, but to explain why these needs can become structurally difficult to realise in commercial educational environments.

This argument has implications for several groups. For children, it shows how decisions made before they enter the classroom may shape bodily comfort, feelings of recognition, interaction and everyday learning experience. For designers, the task is not only to choose more appropriate colours, furniture or decoration, but to negotiate with leased shells, circulation limits, wall-use priorities, visibility requirements and adult-facing marketing pressure. For art training organisations, spatial quality is not separate from educational quality: rent, plan, furniture, lighting and display decisions all affect children's learning conditions. For researchers, commercial informal educational spaces should be treated as an important but underdeveloped category within studies of learning environments.

Compared with existing child-centred design theory, the article extends the discussion in two ways. First, it integrates Piaget, Vygotsky, Erikson, Gibson, Maslow and Bronfenbrenner into a joint framework for analysing children's art training spaces. Second, it adds a market-aware analytical layer to that framework. Existing theories usually explain what an ideal child-centred environment should provide; this article asks why those spatial conditions may be repeatedly blocked in commercial contexts. It therefore shifts attention from design principles

alone to the conditions of spatial production that determine whether those principles can be realised.

The limits of the article should also be stated clearly. This is a conceptual paper, not an empirical study. It does not claim to have measured the frequency of each mismatch across the sector, nor does it claim that all commercial art training centres fail in the same way. Some organisations may respond creatively to commercial constraints, and some designers may achieve strong spatial outcomes within difficult shells. The claim is more specific: under common commercial conditions, the five mismatches identified here are theoretically coherent and structurally predictable. Their actual frequency, intensity and variation across cities, operators and building types require further empirical research.

Future research should test the framework through site-based empirical work. A convergent mixed-methods design is particularly suitable because it can combine spatial measurement, behavioural observation, stakeholder interviews and surveys of children, parents, teachers, designers and operators. Later studies could compare street-front units, ground-floor residential units and converted office spaces, as well as independent studios and chain brands. They could also examine how spatial constraints differ between smaller cities and major metropolitan areas. Through such work, the five structural mismatches proposed here can be converted from theoretical propositions into observable and comparable patterns in real learning environments.

The practical implication is that improvement cannot stop at surface decoration. Designers and operators need to protect child-centred spatial conditions from within commercial constraints: the transition from entrance to classroom should be safer and calmer; glare and street noise should be better controlled; wall areas should reserve child-eye-height display space for children's own work; teaching spaces should support flexible arrangements wherever possible; and furniture and storage systems should match children's bodily scale. Even when the commercial shell cannot be fully changed, targeted interventions can reduce the pressure of commercial logic on children's daily experience. In discussions of lifelong education and inclusive learning, the physical environment should not be treated as background. It is one of the ways in which inclusion becomes a real experience for children rather than an educational slogan.

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