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Research Article

Teaching Urban Geography for a World in Transition: Textbook Representations and Students' Conceptions of Urban Housing in Singapore

✉ Su Peng Cheak¹ & 🌐 Tricia Seow¹

¹ National Institute of Education, Nanyang Technological University, Singapore, Singapore

✉ Correspondence: cheak_su_peng@moe.edu.sg

Abstract: In an era of rapid urbanisation and global interconnectedness, geography education plays a crucial role in shaping students' understanding of diverse urban environments worldwide. This paper examines how the Singapore lower secondary geography textbook influences students' conceptions of people's lived environments in urban areas. Through photo-elicitation interviews with six Grade 7 to 8 students, this study reveals both the positive contributions and limitations of using textbooks as a primary resource in geography education. While the textbooks successfully developed foundational geographical knowledge and fostered national identity, they often gave rise to superficial and binary conceptions about urban housing in different global contexts. The findings also highlight the critical importance of teachers in mediating these narratives to provide more nuanced representations of urban places in the geography classroom, while also underscoring the importance of students' own personal experiences in shaping these understandings. This case study offers broader implications for geography education, particularly regarding how curriculum materials, teacher mediation, and students' personal geographies together shape students' capacity to navigate an increasingly complex and interconnected urban world.

Keywords: Geography Education; Textbooks; Student Conceptions; Urban Housing; Photo Elicitation; Teaching Agency

Highlights:

- Textbooks shape students' views of global urban housing, creating insights and misconceptions.
- Teacher agency provides counter-narratives that challenge and refine students' textbook-generated misconceptions about urban housing.
- Findings call for more balanced representations of urban housing in geography curricula.

1. Introduction

As our world continues to urbanise at an unprecedented rate, with over half the global population now living in cities and this figure projected to reach 68% by 2050 (United Nations, 2018), geography education faces the critical challenge of preparing students to understand increasingly complex urban realities. How students come to understand, and sometimes misunderstand, the urban world around them – including the conceptions they hold about housing, development, and the lived experiences of people in different cities – is an important concern for geography education (Köç et al., 2024; Lane et al., 2018).

Within this context, geography textbooks function as a key mediator between curriculum intentions and classroom enactment. They influence students' understandings of both distant places and their own lived environments, acting as

central pedagogic resources that structure progression, supply canonical case studies, and visualise the world for learners (Bednarz & Lee, 2014; Hilander, 2023). Although Singapore's geography classrooms draw on a range of pedagogical resources including fieldwork, multimedia, and inquiry-based tasks, structured curriculum materials such as textbooks continue to play a key role in supporting lesson progression and conceptual framing, as outlined in the Ministry of Education's (MOE) geography syllabus documents (MOE Singapore, 2023). Research shows that textbook representations can profoundly shape students' conceptions of places and peoples and may inadvertently reinforce stereotypes about other places when narratives are simplified or uncritically curated (Islam & Asadullah, 2016; Sovič & Hus, 2015; Szubert & Żemła, 2019; Trahorsch & Bláha, 2020).

Contemporary urban transitions intensify the need to scrutinise such representations. Phenomena such as climate-related displacement, widening intra-urban inequality, and the digital restructuring of work and mobility complicate conventional descriptions of how cities develop and how people inhabit them (UN-Habitat, 2020). These shifts make it increasingly difficult for homogenised textbook depictions of urban environments to reflect current realities, and without careful mediation, students may develop superficial conceptions of urban places that are ill-suited to interpreting twenty-first-century spatial challenges (Demirci et al., 2018; MGIEP, 2017).

The study addresses this challenge by examining how Singapore's lower secondary geography textbook shapes students' conceptions about people's lived environments in urban areas. Singapore provides a compelling case study for several reasons. Firstly, as a highly urbanised city-state that has undergone rapid transformation from developing to developed status, Singapore's geography education must navigate complex questions about how to represent both local success stories and global urban challenges. Secondly, Singapore's education system operates under a framework of centralised curriculum control, including the control of textbooks that are used in mainstream schools, making them particularly influential in shaping students' conceptions about urban housing and development. Lastly, Singapore's multicultural context and global connectivity mean that students' conceptions about urban housing have implications for how they understand both their own society and the wider world. The research is framed by growing concerns in geography education about the need to develop more critical and nuanced understandings of global urban diversity, particularly in light of persistent stereotypes that can emerge from oversimplified textbook representations (Dörfel et al., 2024, Hintermann, et al., 2014).

Through photo-elicitation interviews with six Grade 7 to 8 students who had completed the Housing topic under Singapore's 2014 Lower Secondary Geography syllabus, this study examines both the positive contributions and limitations of textbook-centred geography education. The findings reveal a complex picture: while textbooks successfully develop foundational geographical knowledge and seek to nurture individuals who are "rooted to Singapore," possess "strong civic consciousness," and can "contribute constructively to their community and nation" (MOE, 2021), they also unintentionally give rise to reductive conceptions about urban housing in different global contexts, partly due to the ways in which cities in more and less developed country contexts are represented. Furthermore, it highlights the important role that teachers play in providing alternative narratives that can mediate these limitations and support students in developing more grounded, ethical, and contextually responsive geographical understandings.

2. Theoretical Framework and Literature Review

2.1. Students' Conceptions

Geography education research has recognised that students do not arrive in classrooms as blank slates. Rather, they bring with them a range of pre-instructional ideas, intuitive theories, and prior understandings constructed from their everyday experiences, media exposure, and social interactions (Lane, 2008; Lane et al., 2018). These mental structures, collectively termed "preconceptions", "alternative conceptions", "misconceptions" or "alternative frameworks", act as cognitive lenses through which students interpret and make sense of new geographical information (Lane, 2008; Mills et al., 2017).

Drawing on the conceptual change tradition from science education, Lane et al. (2018) argue that these intuitive understandings are stored in mental schemas that develop over time and can be highly resistant to change through instruction, because they are functional and useful to the learner in everyday life. Hopwood (2004), in his study of geography conceptions among Year 9 children, demonstrated that students' conceptions are complex, highly personalised phenomena that are shaped by personal experience as well as formal schooling. Mills et al. (2017), investigating

junior secondary students' conceptions about plate tectonics, found that students held numerous alternative conceptions that persisted from prior instruction, underscoring the importance of identifying and addressing such ideas through targeted pedagogical interventions. More recently, Köç et al. (2024), in their study of middle school students' misconceptions about geography concepts in Turkey, found that students possessed various misconceptions regarding geography topics that gradually decreased as they progressed to higher grades, highlighting the developmental nature of geographical conceptual understanding. As Dove (cited in Lane, 2008) notes, key sources of these misconceptions include the oversimplification of concepts, stereotyping in textbooks, and students' preconceptions from private world experiences, all of which are directly relevant to this study's focus on urban housing representations. The conceptual change literature also highlights cognitive disequilibrium – the productive confusion arising when new information contradicts existing mental models – as a driver of deeper learning (Lane et al., 2018).

In the context of this study, students' conceptions of urban housing refer to the mental models and understandings they hold about housing quality, urban development, and the lived experiences of people in different cities and countries. The study therefore seeks to understand how Singapore students' conceptions of urban housing are shaped by multiple sources such as formal instruction through textbooks as well as their own prior experiences, and to examine the role that teachers can play to drive deeper learning through their pedagogical choices.

2.2. Textbooks and Student Conceptions

Geography textbooks occupy a unique position in education systems worldwide, serving as both repositories of authorised knowledge and mediators between formal curricula and classroom practice (Bruillard & Aamotsbakken, 2010; Morgan, 2014; Pingel, 2010). Recent research demonstrates that geography teachers continue to use textbooks extensively for lesson planning, often treating them as the de facto curriculum rather than the official syllabus, particularly in centralised education systems (Lambert, 1999; Miguel, 2015; Simon et al., 2020). Within the students' conceptions framework, textbooks are understood as key sites for the construction and transmission of geographical understanding. Empirical research highlights how simplified or insufficiently contextualised narratives sometimes reproduce reductive representations of places and peoples (Islam & Asadullah, 2016; Lam et al., 2013; Sovič & Hus, 2015; Szubert & Žemla, 2019; Trahorsch & Bláha, 2020). However, it is noteworthy that students do not passively receive these representations but actively engage with them, bringing their own experiences, cultural backgrounds, and spatial understandings to their textbook encounters (Catling, 2005; Hammond, 2020; Scoffham, 2019).

Singapore's centralised textbook system provides a unique research context where a single approved textbook series ('All About Geography') is mandated across all mainstream secondary schools, with no alternative textbook options available to teachers. This monopolistic arrangement creates a natural setting for examining how teacher agency and student interpretation operate when the base material is held constant. The uniform use of the same textbook allows clearer analysis of how identical representations are interpreted, negotiated, and reshaped through classroom practice to shape students' conceptions of urban housing.

Bozkurt (2019) demonstrated that geography textbooks can directly reinforce existing stereotypical conceptions when concepts are presented incompletely or through visuals that fail to convey the full complexity of geographical phenomena. Similarly, Hammond's (2020) study revealed how textbook representations continue to shape students' conceptions of 'other' places, while recent work by Dörfel et al. (2024) analysing German geography textbooks found continued evidence of uneven global representation that privileges certain regions while marginalising others. Lane (2008) identifies stereotyping in textbooks as one of the key sources of students' misconceptions and Köç et al. (2024) found that geographical misconceptions persisted and sometimes deepened when textbook representations were incomplete or oversimplified.

Research on student conceptions of urban environments has revealed distinct patterns. Students often hold binary conceptions of urban development, associating particular housing forms with fixed levels of national development while overlooking political, economic, and policy-driven complexities (Butt, 2011; Scoffham, 2019). The role of personal experience in shaping geographical understanding has also received attention, with research demonstrating that young people's understandings of place are socially constructed through daily practices, emotional attachments, and local contexts, yet may be marginalised by school geography (Catling, 2005; Mitchell & Elwood, 2012; Roberts, 2013).

While existing research provides important insights into textbook representations, there remains a gap in understanding how students engage with and construct meaning from these materials. This study addresses that gap by examining students' conceptions as they emerge from textbook engagement, moving beyond assumptions about textbook influence to investigate the conceptions and misconceptions that are constructed in Singapore's uniquely uniform textbook context.

2.3. Student and Teacher Agency

While textbooks play a crucial role in geography education, recent research has increasingly recognised the importance of both student and teacher agency in mediating textbook content and shaping the conceptions students ultimately develop (Mitchell & Lambert, 2015; Priestley et al., 2015). The concept of "curriculum making" emphasises that teachers are not passive implementers of prescribed curricula but active agents who interpret, adapt, and supplement textbook content based on their professional judgement and understanding of student needs.

Recent multinational research has identified various barriers and enablers that influence teachers' capacity to exercise curriculum thinking and agency in geography education, highlighting complex institutional and contextual factors that shape teachers' professional practice (Krause et al., 2025). Teachers can exercise agency by selecting, supplementing, and re-framing textbook material to present counter-narratives or to provoke critical engagement (Dörfel, 2025; Huckle, 2017; Lambert & Morgan, 2011; Priestley et al., 2015). Lane (2008) argues that teachers need substantive knowledge of students' common alternative conceptions to develop strategies to address them through instruction. Teachers aware of the alternative conceptions that textbook representations may generate are better positioned to design learning experiences that promote conceptual change. Simultaneously, students exercise agency through active interpretation and meaning-making when they bring their own conceptual frameworks to bear on textbook content in ways that can either reinforce or challenge the conceptions those materials promote (Hopwood, 2004).

This interplay between textbook content, teacher agency, and student interpretation is especially consequential in an era of rapid urban change, where textbook content can quickly become outdated or insufficient for understanding contemporary realities. The following research questions guide this investigation:

- **RQ1:** What conceptions of urban housing do Singapore lower secondary students hold following engagement with their prescribed geography textbook, and to what extent do these reflect or diverge from the textbook's representations?
- **RQ2:** How are students' conceptions of urban housing mediated by teacher agency and students' own personal geographies and lived experiences?

3. Materials and Methods

3.1. Research Design and Contextual Scope

This study employed a qualitative case study approach using photo-elicitation interviews (PEI) to examine how Singapore's lower secondary (grades 7-8, ages 13-14) geography textbook shapes students' conceptions about urban housing. Geography is a compulsory subject for all lower secondary students in mainstream schools, who use the prescribed textbook analysed in this research. The MOE maintains strict control over textbook approval through its Curriculum Planning and Development Division. For the 2014 Lower Secondary Geography syllabus examined in this study, only one approved textbook series was available: "All About Geography" published by Hodder Education. This textbook series consists of two volumes (Secondary 1 and Secondary 2) and serves as the primary instructional resource across all mainstream secondary schools in Singapore. All textbooks undergo rigorous MOE review for content accuracy, pedagogical alignment with syllabus objectives, and cultural appropriateness before approval.

The research was conducted with six lower secondary students from a single secondary school who had completed the Housing topic in the geography syllabus. The data was collected in 2021 while the 2014 syllabus was still in active use. Although the materials examined predate more recent curricular revisions, their analysis remains valuable for understanding how textbook representations influence the conceptions students develop about urban environments. The representational strategies used in the 2014 textbooks, such as the emphasis on selected case studies, visual typologies, and comparative framings of urban housing, reflect broader and enduring patterns in Singapore's geography education. The patterns of textbook influence identified in this study, particularly regarding the formation of misconceptions and

the role of teacher mediation in promoting conceptual change, are relevant across diverse educational contexts where textbooks serve as primary pedagogical resources for geography education (Lane, 2008; Mills et al., 2017).

This research utilises a collective case study where a group of cases was analysed sequentially to generate a broader appreciation of the specific issue, in this case the link between school geography and Singapore students' conceptions about urban living. The participants were selected from a single secondary school through purposive sampling because the only prerequisite they needed to fulfil was to have completed studying the topic of Housing at the time of data collection. A total of six participants was selected, consistent with precedents for using five to eight respondents for studies on people's conceptions in relation to epistemological implications for education or people's lived experiences. For example, Del Busso (2011) studied eight women, Seow (2013), Srivastava and Hopwood (2009) and Hopwood (2008) studied six individuals, and Hammond (2020) did her study with five respondents. Hopwood (2004), in his foundational study of pupils' conceptions of geography, similarly worked with a small sub-sample for in-depth interviews, arguing that detailed qualitative data from a small number of participants can yield rich insights into the nature and structure of students' conceptions that larger quantitative studies cannot capture. Consistent with the interpretivist tradition, this study seeks analytical generalisation instead of statistical generalisation, focusing on the transferability of theoretical insights about how textbook representations shape students' conceptions to other contexts where similar curricular conditions apply (Creswell & Poth, 2018). In this study, all six participants were Singapore residents studying in the same class and had been taught by the same geography teacher since Grade 7. In terms of ethnic background, two participants were of Chinese Singaporean ethnicity, two were of Indian Singaporean ethnicity, and the remaining students were more recent migrants of Filipino and Indonesian ethnicity.

3.2. Systematic Textbook Analysis and Narrative Identification

Prior to conducting student interviews, an exhaustive analysis of the prescribed textbook was undertaken to identify all urban housing representations and establish the analytical framework for textbook narratives and their potential to generate misconceptions. The analysis focused specifically on Issue 4: "Housing – How to build inclusive homes for all?" in the Secondary 2 geography textbook, which constitutes the primary curricular treatment of urban housing in Singapore's lower secondary geography education.

The narrative identification procedure followed four sequential steps. First, all housing-related visual and textual content in Issue 4 was catalogued exhaustively, including photographs, captions, diagrams, maps, and accompanying explanatory text. Second, each item was coded according to its geographic location, housing type, and the specific framing of accompanying text (positive, negative, or neutral) in its representation of housing conditions. Third, coded items were grouped into clusters based on recurring visual motifs, consistent textual framing, and thematic alignment with stated learning objectives. Fourth, clusters were evaluated for dominance and representational gaps.

For this study, textbook narratives were operationally defined as the coherent representational patterns comprising: (1) recurring visual motifs across multiple images, (2) accompanying captions and explanatory text, (3) unit learning objectives explicitly stated in the curriculum, and (4) the spatial and thematic clustering of examples. A narrative was considered "dominant" when it appeared in three or more instances with consistent framing and messaging. "Missing narratives" were identified as representations absent from the textbook that contradict or complicate dominant patterns, such as quality housing in less developed countries, housing problems in developed countries, and housing diversity within homogenous urban contexts.

The exhaustive textbook analysis revealed three dominant representational patterns. The first was a Singapore Public Housing Success Narrative, characterised by visual motifs of well-maintained public housing estates with community facilities, green spaces, and modern amenities, accompanied by text emphasising successful housing policies, community integration, and quality affordable housing. The second was an International Housing Challenges Narrative, featuring multiple examples of informal settlements and substandard housing from various cities in less developed countries such as Manila and Nairobi, alongside examples from developed country cities showing housing affordability challenges, such as Hong Kong and New York. The third pattern comprised Housing Concepts and Solutions, including diagrams illustrating housing policies, maps showing spatial distribution patterns, and images of housing improvement projects. Together, these patterns reveal a textbook structured around a binary logic that positions Singapore as an

exemplar of successful housing management while framing cities in less developed countries primarily as sites of housing problems. This in turn poses a representational tendency with direct implications for the types of conceptions students may develop.

3.3. Strategic Image Selection Framework

Building on the systematic textbook analysis, thirteen photographs were sourced from public databases for photo-elicitation interviews using a purposive sampling strategy designed to test the extent and nature of textbook influence on students' conceptions of urban housing. Textbook images were not reproduced directly from the textbook due to copyright restrictions. Instead, photographs from public databases were selected as proxies that closely replicated the visual typologies and representational patterns identified in the textbook analysis. As the photographs used in this study were sourced from public databases, direct links to each image are provided in Table 1 in lieu of reproduced photographs.

The photographs featured different types of urban housing from both developed and less developed countries in textbook-featured and textbook-absent cities. The selection framework employed a deliberate binary structure to serve as a heuristic device designed to surface the full range of students' conceptions, including those that extended beyond or contradicted textbook narratives. Counter-narrative images, particularly those depicting housing realities absent from or contradicting the textbook, were included to induce cognitive disequilibrium by prompting students to confront information that challenged their existing conceptions and to articulate their reasoning (Lane et al., 2018). It is important to note that the binary organisation of the instrument was a methodological scaffold that was designed to be open to and seek evidence of conceptions that moved beyond binary thinking, not an assumption about the nature of students' conceptions.

The selection criteria were as follows. Images were chosen for geographic representativeness, covering countries both featured in and absent from textbook coverage to assess whether textbook-derived conceptions extended beyond explicitly taught examples. Housing type diversity was ensured by including formal housing (public and private), informal settlements, and homelessness across different development contexts. Each image was classified as either "textbook-aligned" (reinforcing dominant narratives) or "counter-narrative" (challenging textbook representations) based on the coding framework established in the textbook analysis. Visual comparability was maintained by selecting images of consistent photographic quality, contemporary timeframe, and urban context.

Table 1 shows a summary of the selected photographs, their alignment with textbook content, and the purpose of their choice and sequence.

Table 1. Photo-Elicitation Images: Housing Types, Locations, and Rationale for Selection

Photo Cluster	Photo ID, Housing Type and Location	Description	Alignment with Textbook Content	Purpose
Cluster 1: Formal housing in developed countries (DCs)	1.1 Public housing, Singapore View image	Public housing blocks with facilities (fitness corners, courts, green spaces)	Singapore's inclusive public housing success	Shows quality public housing – <i>aligns with textbook narrative</i>
	1.2 Luxury housing, Singapore View image	The Interlace - 31 hexagonally arranged apartment blocks, creating a vertical village	Singapore housing diversity	Shows the provision of varied housing types catering to different income groups – <i>aligns with textbook narrative</i>
	1.3 Council housing, United Kingdom View image	Dilapidated Aylesbury Estate flats, Southeast London	Housing challenges in DCs	Counter-narrative to "DC housing = good housing" assumption – <i>missing textbook narrative</i>

	1.4 Private housing, United Kingdom View image	Well-maintained private street, London	Housing quality in DCs	Contrast with Photo 1.3 to show housing diversity in urban areas in DCs
	1.5 Luxury apartment, New York City View image	Uppermost duplex, Manhattan's Puck Pent-houses	Private luxury housing in DCs	Establish understanding of high-end urban housing
Cluster 2: Formal housing in less developed countries (LDCs)	2.1 Public housing, Nairobi, Kenya View image	Low-rise community housing for middle-class nationals	Housing quality in LDCs	Counter-narrative to "developing = poor housing" stereotype – <i>missing textbook narrative</i>
	2.2 Private housing, Mumbai, India View image	1 Bedroom, Hall and Kitchen (BHK) apartment, Mumbai	Affordable housing in LDCs	Challenge textbook over-representation of Mumbai slums – <i>missing textbook narrative</i>
	2.3 Private housing, Philippines View image	Vista Lands gated community with manicured landscaping	Luxury housing in LDCs	Counter-narrative to LDC housing stereotypes – <i>juxtaposed with textbook representation in Photo 4.1</i>
Cluster 3: Informal housing or housing shortage in DCs	3.1 Homelessness, Washington DC View image	Homeless encampment, K Street NE underpass	Housing shortage in DCs	Challenge "DC = no homelessness" assumption – <i>missing textbook narrative</i>
	3.2 Homelessness, Singapore View image	Homeless person against CBD skyline	Local housing challenges	Counter-narrative to Singapore housing success story – <i>missing textbook narrative</i>
	3.3 Informal settlement, Madrid, Spain View image	Cañada Real Galiana shanty town	Housing shortage issues in DCs – informal housing	Challenge "DC = no slums" assumption – <i>missing textbook narrative</i>
Cluster 4: Informal housing or housing shortage in LDCs	4.1 Slum, Manila, Philippines View image	Makeshift stilt houses over water	Slums and squatter settlements in LDCs	Shows typical slum imagery in LDCs – <i>aligns with textbook narrative</i>
	4.2 Upgraded slum, Latin America View image	Medellín improvement project with escalators, walkways	Slum upgrading, self-help schemes	Counter-narrative to "slums = permanent poor conditions"

3.4. Interview Procedures and Data Collection Protocol

Semi-structured photo-elicitation interviews were conducted following a standardised protocol designed to elicit authentic student responses while maintaining analytical consistency across participants. The photo-elicitation method was selected because of its consistency with methods used in conceptions research – it enables researchers to bridge the gap between abstract concepts like students' conceptions of urban housing and concrete understandings of urban environments (Clark-Ibáñez, 2004; Harper, 2002; Mills et al., 2017; Richard & Lahman, 2014). The interview protocol comprised four phases corresponding to the four photograph clusters shown in Table 1. Each phase followed an identical questioning sequence using a modified 5W1H framework:

- *What do you observe in these images?* (descriptive response) – This invites students to describe what they saw without interpretive prompting, establishing a baseline of their observational vocabulary and initial conceptions.

- *Who do you think lives in these environments?* (demographic assumptions) – This probes students' assumptions about the social characteristics of residents to surface stereotypes or generalisations that may have been shaped by textbook representations.
- *Where do you think these images were taken?* (geographic knowledge) – This assesses students' ability to locate housing types within specific geographic contexts, revealing the extent to which textbook case studies had shaped their spatial conceptions of urban housing.
- *Why do people live in these conditions?* (causal reasoning) – This moves students beyond description towards explanation, probing their understanding of the structural, economic, and policy factors that shape housing outcomes.
- *How does this housing compare to your expectations?* (evaluative judgment) – This was designed to surface cognitive disequilibrium by prompting students to reflect on whether images confirmed or contradicted their existing conceptions, making visible any tension between textbook narratives and counter-narrative representations.

The "when" component was omitted as all photographs depicted contemporary contexts. Follow-up probes were used consistently when interviewees required prompting assistance: "What makes you think that way?" and "Can you tell me more about your reasoning?"

Each interview lasted between 65 to 75 minutes and was conducted individually via Zoom, a cloud-based communication platform, in July 2021 due to Covid-era restrictions. The thirteen photographs were displayed via PowerPoint screensharing, with consistent sequencing and timing across all interviews. The interview sessions were audio-recorded with participant consent using Zoom's built-in recording function. All interviews were transcribed verbatim within 48 hours of completion using a standardised format. Transcripts included verbal responses, significant pauses (marked as [pause]), and emotional reactions (marked as [laughs], [surprised], etc.). Each transcript was reviewed against the original recording for accuracy before analysis. This research was conducted in accordance with university ethics policies, with informed consent obtained from all participants and parental permission secured for minor participants (BERA, 2018). All interview data was securely stored and anonymised to protect participant confidentiality.

3.5. Analytical Framework and Coding System

Data analysis employed qualitative content analysis (QCA) using Thomas's (2006) general inductive approach as the primary methodological framework. This approach was selected because it is specifically designed for analysing qualitative evaluation data through a process of category development that is grounded in the data itself, making it well-suited to the exploratory aims of this study. Following this methodology, the analysis was purely inductive rather than combining inductive and deductive coding strategies, as QCA entails a "data reduction process by focusing on selected aspects of data" and extracting relevant categories. Emerging categories are developed from repeated studies of interview transcripts, which are read "horizontally" to facilitate the process of grouping text segments by theme (Marshall, 1999; Thomas, 2006). The analytical process was further informed by established coding procedures from Braun and Clarke (2006, 2021), Charmaz (2006), and Saldaña (2016), which provided complementary guidance on thematic development, grounded theory coding, and codebook construction respectively.

The analysis process involved several iterative stages: (1) Data cleaning for raw data files by standardising the format of collected data before printing transcripts; (2) Close (re)reading of text to identify text segments containing meaning units and synthesise them through open coding to establish units of analysis relevant to this study; (3) Creating categories by grouping similar codes, deriving upper-level or general categories from research aims, and lower-level categories from "in vivo" coding, which entails creating specific categories derived from the units of analysis, with similar categories merged to reduce overlap and redundancy; (4) Continuing revision and refinement of category system by further identifying categories that convey similar core themes and combining them under superordinate categories (Braun & Clarke, 2021; Creswell & Poth, 2018; Suriandjo, 2024).

The refined category system yielded six essential categories aligned to the research focus (see Table 2): Students' Conceptions about People's Lived Environments in Urban Areas; Textbook Influence on Students' Conceptions; Teacher Influence on Students' Conceptions; Other Sources Influencing Students' Conceptions; Accurate Conceptions in Students' Understanding; and Misconceptions in Students' Understanding. Within this refined system, the role of the textbook in influencing students' conceptions was leveraged as an upper-level category because substantive evidence from

both the literature review and photo-elicitation interviews demonstrated that students' conceptions about urban living are heavily shaped by the textbook as primary discourse.

The following codebook represents a post-hoc reconstruction of the analytical categories for transparency purposes.

- Category 1: Students' Conceptions about People's Lived Environments in Urban Areas
 - a. Definition: Student perceptions and understandings about quality indicators and characteristics of urban housing
 - b. Example quote: *"People live here because the housing meets their basic needs, such as providing safe shelter, a good water supply and proper sanitation."* – Student 1
- Category 2: Textbook Influence on Students' Conceptions
 - a. Definition: Direct references to textbook content or clear alignment between student responses and textbook narratives
 - b. Example quote: *"The textbook taught us that migrants live in slums near industrial sites so that the children can go to school while the adults seek employment there."* – Student 2
- Category 3: Teacher Influence on Students' Conceptions
 - a. Definition: Student references to teacher-provided resources, explanations, or activities beyond the textbook
 - b. Example quote: *"My geography teacher showed us a documentary of housing in Brazil and the houses look just like these."* – Student 3
- Category 4: Other Sources Influencing Students' Conceptions
 - a. Definition: Student references to personal experiences, media, family conversations, or other informal sources
 - b. Example quote: *"I think this is the Philippines because I have seen slums in Manila when I return to visit my relatives."* – Student 4
- Category 5: Accurate Conceptions in Students' Understanding
 - a. Definition: Student responses demonstrating factually correct understanding of urban housing concepts and relationships
 - b. Example quote: *"[Residents] may live in these places because of the good locations of the housing, such as being near to a school, hospital or workplace."* – Student 1
- Category 6: Misconceptions in Students' Understanding
 - a. Definition: Student responses revealing inaccurate generalisations or misconceptions about urban housing in different regions
 - b. Example quote: *"I think this slum is found in a poor African country because it looks very underdeveloped... African countries tend to be poorer."* – Student 4

Table 2. Essential Categories Derived from Refined Category System

Students' conceptions about people's lived environments in urban areas as shaped by the textbook	Other factors influencing the accuracy of student conceptions about people's lived environments in urban areas	Alignment with textbook narrative
Factually accurate knowledge about good versus poor quality urban housing	Teacher's talk and resources (documentaries)	✓
	Students' personal experiences (local and overseas)	✓
Misconceptions that may arise from misrepresentation of information	Teacher's resources (pictures and videos)	×
	Students' personal experiences (local and overseas)	×

Given the qualitative and interpretive nature of this analysis, formal intercoder reliability procedures were not employed. This is consistent with the epistemological assumptions underpinning interpretivist qualitative research, where the goal is to develop a theoretically grounded and transparent account of representational patterns (Creswell

& Poth, 2018). As Braun and Clarke (2013) argue, applying intercoder reliability metrics to qualitative thematic analysis can be epistemologically inconsistent as it imposes a positivist standard of objectivity onto a process that is inherently interpretive and context-dependent. The credibility of the analytical categories is instead grounded in their coherence with the existing literature on textbook representation and the transparency of the coding procedure described above, and their explanatory power in accounting for the student conceptions identified in the interview data.

Table A.1. in the Appendix shows the overarching category system employed in this research study.

4. Results

4.1. *The Positive Role of Textbooks in Developing Geographical Knowledge*

The research findings revealed that Singapore's geography textbooks play a crucial and largely positive role in developing students' foundational conceptions of urban housing environments. All six participants demonstrated sound knowledge of the factors that contribute to good and poor-quality urban housing, including access to basic services, safety and security, aesthetic design, and community facilities. Their responses showed clear alignment with textbook content on inclusive housing policies in Singapore and the challenges faced by residents in informal settlements. Students were able to articulate the connections between housing quality and broader urban planning considerations, including proximity to employment, access to services and amenities, the importance of community spaces for social interaction, and the role of government policy in addressing housing needs. For instance, Student 1 explained how housing quality was linked to basic needs and planning provision:

"People live here because the housing meets their basic needs, such as providing safe shelter, a good water supply and proper sanitation... There are various facilities for residents to use, such as badminton and basketball courts and exercise corners for the elderly."

Student 3 demonstrated awareness of the social and emotional dimensions of housing, noting that residents may remain in an estate due to "a strong sense of home and connection to this place" and its "ease of access to amenities." Students frequently associated greenery, innovative design, and efficient land use with positive living environments. For instance, Student 4 suggested that the presence of greenery improved liveability, while Student 5 viewed compact and futuristic design as a pragmatic response to Singapore's spatial constraints.

These responses suggest that textbooks are effective in supporting students' acquisition of key geographical concepts related to urban housing and planning, consistent with Lane et al.'s (2018) observation that well-structured curriculum materials can support the development of accurate conceptual knowledge when concepts are clearly defined and contextualised. However, it is important to note that this accurate knowledge acquisition occurred alongside the internalisation of spatial narratives that positioned Singapore's housing policies as exemplary and normative. Many students expressed gratitude for the availability of public housing and community facilities in ways that reflected the textbook's nation-building function, illustrating how geography education can simultaneously deliver factual content while shaping students' conceptions in ways that privilege certain places and policies over others (Morgan & Lambert, 2010). These strengths coexist with important limitations in how global urban housing is represented, which the following subsections address.

4.2. *Conceptions Beyond the Textbook: Mediation, Negotiation, and Divergence*

The most analytically significant findings emerged from moments where students' conceptions diverged from, complicated, or actively negotiated textbook narratives. These moments of divergence, shaped by teacher mediation, personal geographies, and lived experience, reveal that students are not passive recipients of textbook knowledge but active meaning-makers whose conceptions are more complex than the binary framework of the textbook alone would suggest.

The most prominent pattern in the data was the development of reductive misconceptions about certain cities based on their over-representation as examples of poor-quality housing in textbook materials. Students consistently identified cities such as Hong Kong, Manila, Rio de Janeiro, and Mumbai as places where substandard housing was assumed to be the dominant form. Student 3 remarked that "the textbook is full of images about the poor housing and slum living conditions in Mumbai," while Student 1 associated similar images with "housing situations in Brazil and Hong

Kong." Such responses can be understood as "learned misconceptions", emerging not simply from cognitive limitations but from repeated exposure to simplified or partial representations within formal instruction (Bozkurt, 2019; Lane, 2008; Reinfried & Hertig, 2011). Crucially, however, these textbook-aligned responses were not universal, and several students demonstrated the capacity to move beyond them when prompted by counter-narrative images or when drawing on personal experience.

The most striking example of conception beyond the textbook came from Student 4, whose overseas experience in Manila directly subverted the textbook's framing of the city as a site of housing problems:

"I know there are rich people in the Philippines because I went to Manila [as a child]. As the city centre, Manila is well-developed with a lot of expensive-looking estates. But then I learnt about Manila's slums and squatter settlements in the textbook. It is an eye-opener for me to learn that there can be two completely different sides to a city."

This response is significant because it contradicts the binary logic of the textbook from within the student's own experiential knowledge. Rather than confirming a "developing country = poor housing" conception, Student 4 articulated a more complex understanding of urban diversity that the textbook had not provided. Similarly, Student 6 demonstrated awareness of uneven urban development within Singapore itself, noting that she observed this "whenever [she] walks past old buildings and construction sites in Singapore" – a counter-narrative to the textbook's portrayal of Singapore's housing landscape as uniformly successful. Student 5 went further, directly identifying the absence of counter-narratives in the textbook as a pedagogical limitation:

"I have seen homeless people in Singapore sleeping at bus stops... I know there is a stereotype that everyone in Singapore has a home... But the textbook does not talk about homelessness in Singapore. I believe positive things such as greater unity among people can come out of slum living, but these are not mentioned in the textbook. It may be useful to include such perspectives to broaden our horizons."

This response illustrates a student who has not only recognised a gap in the textbook's narrative but has independently arrived at a critique of its representational choices. Collectively, the responses from Students 4, 5 and 6 suggest that even within a group heavily shaped by textbook narratives, some students had developed more nuanced conceptions through the integration of personal experience and critical reflection.

Binary thinking about urban housing development was nonetheless evident across the group, with students associating expensive housing exclusively with developed countries and poor-quality housing exclusively with developing countries. Student 6 assumed that a photo showing a slum settlement in Spain must depict "a poor African country because it looks very underdeveloped," while Student 5 likened the neat rows of homogenous private housing typical of London streetscapes to Singapore's public housing flats. Student 5 did not recognise that these represent fundamentally different housing typologies – the former being privately owned low-rise terraced housing, and the latter being high-rise public housing blocks, known locally as Housing Development Board (HDB) flats, in which over 80% of Singapore's resident population lives. A further misconception related to country size and housing form: four out of six students argued that only large countries could accommodate low-rise or spacious housing, explicitly excluding Singapore from such possibilities. While this response is unsurprising given that Singapore's public housing landscape is characterised by ubiquitous high-rise HDB flats that house over 80% of the resident population, it suggests that students had overgeneralised from their own context, assuming such constraints necessarily preclude low-rise housing everywhere.

The research also revealed misconceptions about homelessness and housing inequality within developed countries. When presented with an image of a homeless person in Singapore, some students struggled to reconcile this reality with textbook narratives about successful housing policies. Student 4 suggested the individual may have "left his home on his own," while Student 3 framed homelessness as an exception, assuming the homeless man was "a foreigner who cannot afford a house in Singapore." Such responses illustrate the kind of "learned misconception" that Lane (2008) describes: a blind spot in conception that is functional and plausible to the learner within the framework provided by formal instruction, yet fundamentally at odds with the complexity of the real world.

4.3. Teacher Agency in Providing Alternative Narratives

One of the most significant findings of this research was the crucial role that teachers can play in mediating textbook content and addressing the possible misconceptions generated by textbook representations. Clear differences emerged in students' understandings depending on whether teachers had supplemented textbook materials with additional resources. The most striking example involved students' conceptions of homelessness in Singapore. While some students struggled to reconcile the image of a homeless person in Singapore with textbook narratives, Student 1 immediately recognised the situation due to prior classroom exposure:

"My geography teacher showed this photo in class! She said it's Singapore!... I thought there was no homelessness in Singapore until my geography teacher taught me otherwise."

That three out of six students recognised the image, with Student 1 explicitly attributing this to teacher-introduced counter-narratives, suggests that teacher agency plays a meaningful role in shaping students' conceptions of urban housing diversity. However, since all participants were from the same class, the divergence between students cannot be attributed to differential exposure to instruction alone. Factors such as differences in individual attention, memory, and personal resonance with content may equally explain why some students retained this counter-narrative while others did not. This points to the need for future research that more systematically traces the relationship between teacher-mediated instruction and students' conceptions.

Beyond this example, other students also demonstrated more expansive understandings where teachers had encouraged engagement with supplementary materials. For instance, Student 3 explained that independent online research conducted for a geography project helped him recognise that certain housing forms were not confined to a single country or region, while Student 1 recalled how a classroom video illustrated how artistic design could improve the liveability of dense housing environments. Notably, Student 2 suggested that housing quality was "not necessarily pegged to income level because landed or private housing may be cheaper in less developed countries," while Student 3 recognised that housing quality could exist on a spectrum, "especially in areas that are neither bustling cities nor old kampongs" – kampong is a Malay term referring to traditional rural villages, historically common in Singapore before large-scale urban redevelopment transformed much of the country's housing landscape. These responses suggest that teacher-mediated engagement with supplementary materials can support students in moving beyond the binary framework of the textbook.

While the limited scope of this study prevents broad generalisation, the findings suggest that teacher agency in curriculum making – the interpretation, adaptation, and supplementation of prescribed materials – plays an important role in fostering more critical, inclusive, and contextually grounded conceptions of urban housing. However, further research with larger samples would be needed to establish the broader significance and replicability of these teacher-mediated interventions (Priestley et al., 2015).

5. Discussion

This discussion addresses the two research questions that guided this investigation, examining the conceptions of urban housing that Singapore secondary school students hold following textbook engagement, and the ways in which these conceptions are mediated by teacher agency and students' personal geographies and lived experiences.

5.1. Teacher Agency and Curriculum Making

The findings of this study directly address RQ1 by revealing that students' conceptions of urban housing are shaped by textbook narratives but are not reducible to them. While binary conceptions such as "developed countries = good housing, developing countries = poor housing" were evident, the more analytically significant finding is that these conceptions were consistently complicated, negotiated, and in some cases overturned when students drew on teacher-mediated knowledge or personal experience. This pattern suggests that binary thinking represents an initial cognitive strategy for organising new geographical knowledge (Béneker et al., 2013; Roberts, 2013) rather than a fixed endpoint, and that the conditions under which students move beyond it are both identifiable and pedagogically actionable.

The textbook analysis revealed dominant spatial representations that present Singapore as an exemplar of successful housing policy while positioning cities like Manila, Mumbai, and Rio de Janeiro primarily as examples of housing challenges. Five out of six participants developed conceptions that reinforced these binary distinctions. However, the

same participants also demonstrated the capacity for more complex geographical thinking, particularly when counter-narrative images induced cognitive disequilibrium or when personal experience provided an alternative frame of reference. Student 4's recognition that Manila contained both luxury estates and slums, Student 5's critique of the textbook's omission of homelessness in Singapore, and Student 2's observation that housing quality was not necessarily pegged to income level all represent conceptions that exceeded the binary framework of the textbook. These findings suggest that the persistence of binary thinking reflects the dominance of textbook narratives only in the absence of deliberate counter-narrative provision. The persistence of binary conceptions among students also suggests that current textbook approaches are inadequate for preparing students to understand the complexity of contemporary urban realities (Hopkins, 2001; Morgan & Lambert, 2005; Scoffham, 2019; Sovič & Hus, 2015; Szubert & Żemła, 2019).

The findings also support previous research on the role of geography textbooks in nation-building and identity construction (Laaloua, 2023; Seow et al., 2015), while highlighting how curriculum reform alone is insufficient without corresponding changes in textbook content and teacher preparation. Geography education needs to embrace more nuanced approaches that recognise the diversity of urban experiences within and between different contexts, including case studies that highlight housing coexistence within single cities and the role of local policies and histories in shaping urban development — an approach that also supports UN SDG 11's emphasis on inclusive, safe, resilient, and sustainable cities.

Responding to RQ2, teacher agency in the form of “mediated engagement” emerged as a meaningful factor in determining whether students developed accurate or inaccurate conceptions of urban housing (Brooks et al., 2017). While it cannot be confirmed that Student 1's recognition of homelessness in Singapore was solely attributable to the geography teacher's deliberate inclusion of textbook-absent narratives, the fact that three out of six students were able to recognise the image, with Student 1 explicitly crediting teacher intervention, suggests that teacher-introduced counter-narratives can challenge textbook-generated misconceptions and activate students' capacity to connect personal experiences with formal geographical knowledge (Godley & Loretto, 2013; Lane, 2008; Lambert & Morgan, 2011; Solorzano & Yosso, 2001). That the remaining students struggled to reconcile the image with their existing conceptions nonetheless highlights that teacher agency alone is insufficient, and that factors such as individual attention and personal resonance with content mediate the extent to which counter-narratives are retained. This underscores the need for geography education systems to move away from models that treat teachers as passive deliverers of prescribed content towards recognising them as professional curriculum makers who can identify the misconceptions that textbook representations are likely to generate and address these through the provision of counter-narrative resources (Butt, 2011; Lane et al., 2018; Mitchell, 2017; Priestley et al., 2015; Qing-li et al., 2024).

5.2. Drawing on Students' Personal Geographies

Students' lived experiences, both locally and abroad, functioned as existing cognitive schemas that, when purposefully activated, enabled students to negotiate prescribed geographical narratives and move toward more accurate conceptions of urban housing diversity (Lee, 2023; Wepener, 2023). Student 4's overseas experience in Manila subverted the textbook's framing of the city as a site of housing problems, Student 5's encounters with homelessness in Singapore led him to question the textbook's narrative of universal housing provision, and Student 6's everyday observations of uneven development in Singapore surfaced counter-narratives that the textbook had omitted. These examples align with Catling's (2005) argument that teachers play a pivotal role in harnessing students' personal geographies to foster deeper, more critical engagement with curriculum content.

However, the data also revealed an important limitation relevant to RQ1: without structured teacher mediation, personal experience tends to challenge specific misconceptions without producing broader conceptual change (Hopwood, 2004). Student 4's awareness of housing diversity in Manila did not prevent her from describing private housing as “normal” for western countries. This highlights that the persistence of misconceptions reflects not cognitive limitation but the absence of deliberate pedagogical strategies that connect lived experience to formal geographical knowledge (Lane, 2008; Lane et al., 2018).

Together, these findings offer a consolidated answer to both research questions. In response to RQ1, students' conceptions of urban housing diverge from textbook narratives most significantly when personal experience or teacher-provided counter-narratives introduce information that disrupts existing mental schemas. In response to RQ2, personal geographies and teacher agency function as complementary but unequal mediating forces. Students who developed the most accurate and nuanced conceptions were those whose formal and informal sources of geographical knowledge

had been brought into productive dialogue, either through teacher-mediated activities or through personal experiences sufficiently powerful to challenge textbook narratives. Personal geographies remain a necessary but insufficient condition for conceptual development without structured teacher mediation. This stresses the centrality of teacher agency in addressing students' misconceptions and equipping students to navigate the complex urban realities of a world in transition.

6. Recommendations and Conclusion

This study has demonstrated that Singapore's lower secondary geography textbook plays a foundational but double-edged role in shaping students' conceptions of urban housing. While textbooks successfully transmit core geographical knowledge and foster national identity, their binary representational logic also gives rise to conceptions that oversimplify global urban development and can persist long after formal education ends.

Addressing this requires coordinated action across three levels. At the curriculum and textbook level, developers and publishers should conduct systematic reviews to identify representations likely to generate superficial and stereotypical conceptions, diversifying case studies to ensure balanced portrayals of urban challenges and successes across different global contexts, and incorporating counter-narratives that challenge common misconceptions about specific cities and regions (Decker, 2014; López et al., 2018; Rifaad & Aernouts, 2023; Sandercock, 2023). Since textbook development operates within state-mandated curriculum frameworks, curriculum reform must precede textbook transformation. Meaningful change requires alignment between policy, content development, and classroom implementation.

At the teacher level, professional development programmes must equip geography teachers to critically evaluate textbook content, recognise the misconceptions that simplified representations are likely to generate, and build repertoires of counter-narrative resources and pedagogical strategies for addressing these through instruction (Lane, 2008; Lane et al., 2018; Mills et al., 2017). Professional learning communities and curated databases of diverse case studies and multimedia resources can support this work, alongside institutional conditions like time, collaborative structures, and curricular flexibility, which will enable teachers to exercise genuine curriculum agency in practice (Krause et al., 2025).

At the classroom level, teachers must be empowered to draw purposefully on students' personal geographies as resources for conceptual development, activating the lived experiences that this study has shown can independently challenge textbook narratives when brought into productive dialogue with formal geographical knowledge. Ultimately, preparing students to navigate an increasingly complex and contested urban world demands geography education systems that are themselves willing to embrace complexity. This involves empowering teachers as thoughtful curriculum makers and students as critical thinkers capable of engaging with the ever-changing urban realities of our shared future.

Appendix

Table A.1. Overarching Category System

Main Categories	Students' conceptions about urban living (in DCs and LDCs)	Role of school geography in shaping students' conceptions about urban living	Other factors influencing students' conceptions about urban living
Sub Categories	Good versus poor quality housing	Textbook pictures Textbook descriptions Research projects Documentaries	Students' personal experiences; Overseas trips; Movies; Videos; Social media; Blogs; Magazines; Advertisements; TV shows; Storybooks
	Housing shortage and vulnerable groups	Textbook descriptions Teacher talk/ videos	Students' personal experiences; Overseas trips; Movies; Other subjects; Conversations; Documentaries
	Quality of environment; Housing affordability; Housing choice and location	Textbook descriptions Videos/ Documentaries	Documentaries; students' personal experiences

Health and safety; Access to services, facilities and jobs to meet people's needs; Sense of belonging to larger community; Role of the government in housing management Misconceptions	Textbook descriptions	Students' personal experiences
	Overrepresentation of featured in- formation in textbook	Students' personal experiences; Overseas trips; Conversations
	Reinforcement by teacher talk/ re- sources	
	Underrepresentation of other rele- vant information in textbook (e.g. counter-narratives)	
Students' feelings about public and private housing	Textbook descriptions	Students' personal experiences
Housing design and customisability	–	Reality TV shows; Students' personal experiences; Overseas trips; Other subjects

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Teaching Geography
for a World in Transition

Contribution to the Special Issue Topics: This article contributes to the Special Issue's focus on powerful geographical knowledge, critical pedagogies, and teacher agency in times of transition. By examining how Singapore's centralised geography textbook shapes students' conceptions of urban housing, the study engages with questions of spatial justice, epistemic uncertainty, and contested curriculum knowledge. It highlights the transformative potential of teacher-mediated counter-narratives in equipping students to critically navigate an increasingly complex and unequal urban world.

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