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The scaffolding interrogatives method (SIM): A theory-driven and Implementation Science-aligned framework for advancing reading comprehension and inclusion

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Abstract
The Scaffolding Interrogatives Method (SIM) is a structured, dialogic comprehension framework designed to transform decoding into meaningful understanding through graduated, purposeful questioning. Grounded in socio-constructivist theory, particularly Vygotsky's Zone of Proximal Development and Bruner's Instructional Scaffolding, SIM conceptualizes comprehension as an actively mediated process shaped through guided interaction and gradual release of responsibility. Operationalized through sequenced interrogatives (who, what, where, when, why, and how), SIM externalizes the organizational structure of text, making linguistic relationships visible for learners who struggle with inference generation, integration, and metacognitive monitoring. The method is particularly relevant for children with hyperlexia, specific reading comprehension disorder, and other profiles characterized by intact decoding but weak inferential reasoning. By employing a written interrogative matrix and structured supports such as the What Interrogatives Method (WIM), SIM reduces reliance on transient verbal prompting and promotes independent strategy use. Empirical findings, including single-subject intervention research, provide preliminary evidence of improved comprehension performance and increased learner autonomy. Beyond classroom application, SIM aligns with principles of Implementation Science due to its operational clarity, observable components, defined core practices (graduated questioning, responsive scaffolding, and gradual release), and suitability for fidelity monitoring, practitioner training, and system-level scaling. The SIM-based INSPIRE model further demonstrates how interrogative scaffolding can be systematically structured into phased intervention, leading to measurable gains in inferential reasoning and narrative coherence. Collectively, SIM reframes comprehension intervention as an explicit, visual, and transferable cognitive framework that supports independence, academic participation, and inclusive educational practice.

Keywords: Hyperlexia, Implementation Science, Interrogative scaffolding, Reading comprehension intervention, Scaffolding Interrogatives Method (SIM)

Introduction

The Scaffolding Interrogatives Method: Theoretical Foundations and Instructional Rationale

The Scaffolding Interrogatives Method (SIM) is a structured, dialogic instructional approach that uses carefully sequenced questioning to guide learners in constructing meaning from text or spoken language (Chia, 2002) [1]; Chia & Kee, 2013) [2]; Ng & Chia, 2013) [3]; Ng, 2014) [4]. Rather than treating comprehension as a passive outcome of decoding, SIM conceptualizes understanding as an actively mediated cognitive process shaped through interaction (Ng & Chia, 2014) [5].

The method is grounded in socio-constructivist theory, particularly the Vygotskyian concept of the Zone of Proximal Development (ZPD), which posits that learning occurs most effectively when a more knowledgeable other supports a learner just beyond their independent capability (Vygotsky, 1978) [6]. SIM also reflects Jerome Bruner's notion of instructional scaffolding, whereby temporary supports are strategically provided and gradually withdrawn as competence increases (Bruner, 1987) [7].

Operationally, SIM employs graduated interrogatives, i.e., who, what, where, when, why, and how, to shift learners from literal recall toward inferential, evaluative, and metacognitive thinking. This structured questioning sequence mirrors principles found in reciprocal teaching (Palincsar & Brown, 1984) [8] and research on comprehension strategy instruction (Chia & Kee, 2013) [2]; Ng & Chia, 2014) [5]; Snow, 2002) [9]. Through dialogic engagement, readers strengthen receptive language, integrate information, and develop awareness of their own thinking processes.

SIM: The Cognitive Bridge for Struggling Comprehenders

The value of SIM becomes particularly evident when working with children who experience reading or listening comprehension difficulties (Chia & Kee, 2013) [2]. Many struggling comprehenders, particularly those with receptive and/or expressive language disorders, specific language impairment (SLI), intellectual and developmental disabilities, (IDD) or limited background knowledge, may decode text adequately but fail to integrate ideas, generate inferences, or monitor understanding. Research (Cain & Oakhill, 2007) [2]; Chia & Kee, 2013) [2]; Singh & Chia, 2026) [11] suggests that such learners often exhibit weaknesses in inference generation and text integration despite intact word recognition.

SIM addresses these vulnerabilities by externalizing the hidden processes of comprehension. Instead of assuming that learners will spontaneously infer meaning, the adult explicitly models how to identify key elements (characters, settings, events), trace causal relationships, and interpret intentions. Through structured layers of questioning, thinking becomes visible and supported. Over time, these guided interrogatives are internalized as self-questioning

strategies, promoting independent comprehension and metacognitive control (Pressley, 2006) [12].

Thus, SIM functions as a cognitive bridge: it connects surface-level decoding to deeper meaning-making through scaffolded interaction.

SIM: The Central Intervention Framework for Hyperlexia & Poor Reading Comprehension

For many decades, research studies (e.g., Åsberg & Sandberg, 2010) [13]; Clarke *et al*., 2010) [14]; Idol-Maestas, 1985) [15]; Singh, Heng, & Chia, 2026) [16]; Yuill & Joscelyne, 1988) [17] on comprehension interventions consistently demonstrates that organizational supports enhance understanding for poor comprehenders. These findings suggest that while skilled comprehenders instinctively recognize and organize linguistic relationships within text, poor comprehenders often lack this spontaneous organizational ability (Åsberg & Sandberg, 2010) [13]; Clarke *et al*., 2010) [14]. For proficient readers, external supports may appear redundant because they mentally structure information automatically. In contrast, struggling comprehenders benefit significantly when these organizational relationships are made explicit (Singh, Heng, & Chia, 2026) [16].

The Scaffolding Interrogatives Method (SIM) directly addresses this gap (Chia & Kee, 2013) [2]; Ng, 2014) [4]. Rather than assuming that learners can independently discern how ideas in a text relate, SIM externalizes the hidden organizational framework of language. By systematically structuring text through graduated interrogatives (i.e., who, what, where, when, and why) SIM makes salient the relationships that skilled readers perceive intuitively (Chia & Kee, 2013)) [2]. In doing so, it compensates for the absence of internal organizational strategies and provides a concrete pathway toward independent comprehension.

SIM and the "Wh" Question Gap

One persistent difficulty observed among poor comprehenders involves responding accurately to "Wh" questions (Deevy & Leonard, 2004) [18]; Goodwin, Fein, & Naigles, 2012) [19]; Hundert & van Delft, 2009) [20]; Schulz & Roeper, 2011) [21]. These interrogatives (i.e., who, what, when, where, and why) form the structural backbone of narrative and informational texts. However, for many struggling learners, the underlying organization of text around these interrogatives remains opaque.

SIM intervenes precisely at this point. Instead of relying on verbal questioning alone, the method provides a written, visual matrix that concretely maps each interrogative category. Clues from each sentence are entered into corresponding columns (e.g., who=what person, what=what happened, where=what place, when=what time), thereby transforming abstract comprehension demands into visible and organized information (Chia, 2002) [1]; Chia & Kee, 2013) [2]; Ng & Chia, 2014) [5].

To further scaffold this process, the What Interrogatives Method (WIM) structures the interrogatives in developmentally accessible forms (Chia, 2002)) [3]: (i) "What person" for *who*; (ii) "What place" for *where*; (iii) "What time" for *when*; (iv) "What reason" for *why*; and (v) "What happened" for an occurrence. This restructuring has helped to reduce linguistic complexity and clarifies the search criteria within the text. Rather than depending heavily on teacher prompts, learners are guided to locate and record answers independently. In this way, SIM not only supports comprehension but also reduces reliance on continual adult mediation.

Importantly, research (e.g., Chia, 2002) [1]; Hundert & van Delft, 2009) [20]; Ng & Chia, 2014) [5] indicates that poor comprehenders are least efficient when organizational patterns are taught through verbal guidance alone. SIM addresses this limitation by replacing transient verbal prompts with stable written supports. The matrix functions as a permanent visual organizer, leveraging learners' preference for written structure and minimizing processing demands associated with oral questioning.

SIM: The Evidence-Based and Independence-Building Strategy

Empirical support further strengthens SIM's instructional value. A single-subject study of SIM intervention demonstrated measurable improvement in comprehension performance during treatment (Chia, 2002)) [1], supporting its classification as an evidence-based practice.

One of SIM's most significant advantages lies in its capacity to foster independence. Within classroom settings, the matrix reduces the need for continuous teacher assistance, allowing educators to shift from constant prompting to strategic monitoring. More importantly, learners gain a replicable strategy that can be applied autonomously.

This independence is particularly crucial in assessment contexts, where teacher scaffolding is unavailable. By generating the SIM matrix independently, students can systematically organize textual information and work toward accurate responses. In this respect, SIM functions as a form of programmed instruction and may be conceptualized as assistive technology (Blackhurst, 2005) [22], as it embeds guidance directly into a structured written format.

SIM and Mainstream Inclusion for Children with Hyperlexia

The structured and validated nature of SIM holds particular promise for children with hyperlexia. These learners often demonstrate advanced word decoding yet struggle with comprehension organization and integration. By explicitly mapping the structure of text through interrogative scaffolding, SIM aligns with their strengths in visual and written processing while compensating for weaknesses in inferential organization.

Educators implementing SIM must, however, remain mindful of sensory sensitivities, attentional challenges, and processing differences that may influence performance. Providing a conducive environment, minimizing extraneous stimuli, offering adequate time, and clarifying missed instructions remain essential complements to the method.

Importantly, educators should resist allowing diagnostic labels to constrain instructional expectations. In *The Way I See It*, Temple Grandin, an American professor, inventor and ethologist, describes how individuals with autism often process information in a bottom-up manner, focusing first on details before integrating them into larger concepts (Grandin, 2011) [23]. SIM harmonizes with this processing style by organizing discrete textual details (who, what, where, when) before guiding learners toward broader inferential and evaluative understanding.

By helping children with hyperlexia physically and visually trace how text is organized, SIM transforms comprehension from an abstract demand into an accessible, structured task: some kind of a visual matrix organizer (Chia, 2002) [1]. In doing so, it not only enhances academic participation but also supports meaningful inclusion within mainstream classrooms.

The SIM reframes comprehension intervention by making textual organization explicit, visual, and systematic. Through its structured interrogative matrix and graduated scaffolding, SIM compensates for deficits in spontaneous organization, reduces dependence on verbal prompting, and promotes learner autonomy.

For children with hyperlexia and specific reading comprehension disorder, SIM offers more than support (Singh, Heng, & Chia, 2026) [16]. The method provides a transferable cognitive framework that transforms decoding ability into genuine understanding, thereby strengthening both independence and inclusion.

Instructional Implementation of SIM: A Graduated Sequence

The implementation of SIM typically unfolds in progressive stages that mirror its theoretical foundations (see Table 1 below).

Table 1: The Five progressive Stages in SIM

Stage No.	Stage Name	What it involves
1	Orientation and Schema Activation	Instruction begins with activating prior knowledge and establishing a purpose for reading or listening. For instance, before reading a story about a lost puppy, the adult might ask, "What do you know about pets getting lost?" Such prompts prime schema activation and prepare the learner to integrate new information (Snow, 2002) [9].
2	2. Literal Interrogatives	During or immediately after the text, the adult introduces factual questions: "Who is the main character?" "Where did the puppy go?" These anchor comprehension in explicit information and ensure attentional focus.
3	Relational and Inferential Interrogatives	The scaffold then shifts toward causal and emotional reasoning: "Why did the puppy leave the yard?" "How do you think the owner felt?" Supports such as sentence starters, visual organizers, or guided cues may be used to reduce cognitive load.
4	Elaborative and Evaluative Questioning	Questions deepen to application and reflection: "What could the owner have done differently?" "What lesson can we learn?" Learners are encouraged to synthesize and evaluate information.
5	Gradual Release and Self-Questioning	Finally, responsibility is transferred to the learner, who generates their own questions. This gradual fading of support reflects core scaffolding principles (Bruner, 1987)) [7] and fosters self-regulated comprehension (Pressley, 2006) [12].

Through this layered progression, SIM transforms questioning from a teacher-driven activity into a learner-owned cognitive strategy.

Application Across Contexts: Listening and Informational Text

Because SIM targets meaning construction rather than a specific format, it is adaptable across reading and listening contexts.

In listening comprehension, for example, a teacher might provide multi-step instructions: "After recess, put your bag in the locker, wash your hands, and sit quietly for reading." A child with sequencing difficulties may struggle to retain and organize this information. Using SIM, the adult scaffolds understanding through sequential interrogatives: "When do we put the bag in the locker?" "What do we do next?" "Why do we wash our hands?" These prompts reconstruct temporal order and causal logic, often supported by visual or gestural cues (Cain & Oakhill, 2007) [10].

Similarly, in an informational text about plants, questioning progresses from literal ("What do plants need to grow?") to causal ("Why is sunlight important?") to predictive ("What might happen if a plant does not get enough water?"). If difficulty arises, the adult narrows the question (e.g., forced-choice prompts) before gradually re-expanding it—an adaptive adjustment consistent with scaffolding theory (Bruner, 1987) [7].

Across contexts, SIM remains responsive rather than rigid. Effective implementation requires sensitivity to linguistic level, pacing, and emotional readiness. Over-questioning may overwhelm learners; therefore, interrogatives must be purposeful, sequenced, and calibrated.

When applied thoughtfully, SIM strengthens vocabulary integration, inferential reasoning, narrative coherence, and metacognitive regulation, especially for children who can benefit from structured and predictable interaction.

Extending SIM into Systems: A Lens from Implementation Science

Having established the theoretical and instructional foundations of SIM, its relevance extends beyond classroom technique to system-level adoption. SIM fits coherently within the field of Implementation Science (ImSc), which examines not only whether interventions are effective, but how they are introduced, delivered with fidelity, adapted to context, and sustained over time (Fixsen *et al*., 2005) [24]; Proctor *et al*., 2011) [25].

SIM is especially compatible with this ImSc framework because it is clearly structured, teachable and observable, operationally defined, and measurable across implementation domains.

The three key components of SIM, i.e., (i) graduated questioning, (ii) responsive scaffolding, and (iii) gradual release, can be articulated as essential practice elements. This clarity allows for competency-based training, fidelity checklists, coaching protocols, and outcome monitoring systems.

Implementation outcomes such as acceptability, adoption, fidelity, and effectiveness (Proctor *et al*., 2011) [25] can be systematically evaluated. Because SIM involves observable interactional behaviors (e.g., the proportion of inferential questions or degree of scaffold fading) fidelity measurement is feasible. Its adaptability across reading and listening contexts further enhances contextual fit, a critical determinant of sustainability (Damschroder *et al*., 2009) [26].

In this way, SIM moves from being merely an instructional strategy to a scalable, system-embedded practice aligned with contemporary frameworks for translating theory into routine educational delivery.

Introducing the SIM-Based INSPIRE Model

Building upon the theoretical and implementation foundations of the SIM model, the INSPIRE model (Interrogative Scaffolding for Progressive Reading Engagement) represents a structured application designed specifically for reading comprehension intervention. The INSPIRE model synthesizes principles from Lev Vygotsky's Zone of Proximal Development (Vygotsky, 1978) [6], Jerome Bruner's scaffolding theory (Bruner, 1987) [7], and the Reciprocal Teaching frameworks (Palincsar & Brown, 1984) [8].

It operationalizes interrogative scaffolding into clearly defined phases that guide learners from supported comprehension to independent strategy use.

Case Study: Application of the INSPIRE Model

Amos (pseudonym), a 10-year-old Primary 4 student, demonstrated adequate decoding but significantly weak inferential comprehension. Standardized assessments showed fluent grade-level reading. However, the child struggled with inferential questions and produced tangential responses, which are consistent with profiles described in comprehension research (Cain & Oakhill, 2007) [10]; Snow, 2002) [9].

The intervention program for Amos consisted of eight weekly 45-minute sessions conducted by a qualified educational therapist.

Table 2: Steps taken in the INSPIRE Model

Steps taken		What each Step involves
(I)	Initiate and Identify	This involves prior knowledge being activated before reading. For example, before a narrative about a boy moving to a new school, Amos was asked about experiences of feeling nervous in new environments. This schema activation facilitated integration.
(N)	Narrow Literal Focus	Structured factual questions anchored understanding. Visual organizers and sentence starters were applied to reduce cognitive load in Amos' reading attempt to understand.
(S)	Scaffold Inference	Causal and emotional reasoning were introduced. When responses remained superficial, the educational therapist modeled think-aloud strategies (Pressley, 2006) [12] to aid Amos, externalizing his inferential reasoning.
(P)	Promote Prediction and Perspective	Amos anticipated possible outcomes and explored character viewpoints. Prompts gradually shifted from directive to open-ended.
(I)	Internalize Strategy	Amos generated his own questions. Initially literal, his queries evolved into inferential ones, indicating emerging metacognitive regulation.
(R-E)	Reflect and Evaluate	Amos summarized and evaluated character decisions, integrating meaning at a higher level.

By the eighth intervention session, qualitative improvements could be observed in Amos' inferential accuracy and narrative coherence. School-based measures (e.g., Neale Analysis of Reading Ability-3rd Edition) showed moderate gains, and teachers reported increased classroom participation. Scaffolds were progressively withdrawn, consistent with ZPD principles (Vygotsky, 1978) [6].

Conclusion

The Scaffolding Interrogatives Method translates socio-constructivist theory into a structured, dialogic practice that advances learners from literal recall to higher-order reasoning. Through graduated questioning, responsive scaffolding, and deliberate fading of support, SIM strengthens comprehension processes central to academic success.

When situated within Implementation Science, SIM becomes not only a classroom strategy but a scalable, fidelity-sensitive instructional innovation. The INSPIRE Model exemplifies how SIM principles can be systematically operationalized to address persistent comprehension deficits.

Together, SIM and INSPIRE demonstrate how structured interrogative scaffolding can transform comprehension from a hidden cognitive struggle into a guided, internalized, and increasingly independent meaning-making process.

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