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Nurturing Young Minds: SWOM-Based Reading as a Catalyst for Reflective Thinking in Early Childhood

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Abstract. This study examined the perceived effectiveness of the School-Wide Optimum Model (SWOM), an instructional framework designed to support inquiry-based and reflective learning, in enhancing reflective thinking and promoting deep learning among five- to eight-year-old children. The data was collected through semi-structured interviews with 93 Jordanian early childhood teachers and analyzed using grounded theory. Participants reported notable improvement in children's cognitive engagement, as almost 97 percent reported

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observing greater attention to detail, enhanced visual perception and an improved ability to interpret information. Additionally, about 99 percent of the participants reported that children began asking evaluative questions, making logical inferences and engaging more deeply with both visual and written materials. For example, some children linked changes in illustration color to shifts in story mood or questioned a character's actions using textual evidence, signaling emerging higher-order thinking. These findings suggest that SWOM supports the development of visual literacy, independent reasoning and comprehension skills. However, as the study relied solely on teacher-reported data, the findings should be interpreted with caution. The absence of direct assessment limits the generalizability of the results. The authors recommend integrating SWOM into early childhood curricula and encourage further research using classroom observations and structured assessment tools to validate and expand upon the current findings.

Keywords: pedagogical practices; reflective thinking; SWOM, visual literacy

1. Introduction

The concept of reading has evolved from the basic skills of word recognition and language comprehension (Hawamdeh et al., 2025) to a complex, multifaceted process of simultaneously extracting and constructing meaning through interaction and involvement with written language (Al-Ghamdi, 2019; Al-Mosbahi, 2024). This involves knowledge, skills and strategies for the understanding, interpretation, analysis, evaluation, and reflection (Bataineh et al., 2007) which do not come naturally to humans but rather need to be taught. This reconceptualization underscores reading as essential not only to academic success but also to personal and cognitive growth (AlAli et al., 2025).

Reading plays a vital role in promoting autonomy, logical reasoning and critical evaluation skills (Amumpuni et al., 2024). It nurtures cultural identity, broadens worldviews and enhances verbal expression (Al-Mosbahi, 2024; Bani Irshid et al., 2023), forming the foundation for cultivating informed, pluralistic global citizens (Al-Ghamdi, 2019). As argued by cognitive development research (AlAli & Al-Barakat, 2023; Al-Ghamdi, 2019), teaching strategies must adapt to promote reflection and deeper engagement, transforming students from passive recipients to reflective, self-directed learners.

Reflective thinking, as a key cognitive process, helps learners question assumptions, restructure prior knowledge, and build autonomy (Orakci, 2021). Each reading session thus becomes a reflective opportunity that demands mental engagement and encourages critical thought (Simango, 2023). As understanding deepens beyond surface-level comprehension, students gain tools for lifelong learning and self-awareness (AlAli & Al-Barakat, 2022; Al-Ghamdi, 2019; Sujinem, 2025).

Metacognition and reflective thinking contribute to active, self-regulated learning (Ghanizadeh, 2017). These skills are especially critical in early childhood, a formative stage for building the habits of analysis, creativity and

inquiry. Language instruction, in particular, benefits from reflective reading, which enhances learners' ability to structure arguments and evaluate texts (Al-Hassan et al., 2025; Oo & Habók, 2020).

Reading, as a foundational skill, also helps young learners become autonomous, self-directed, self-confident and self-reliant, and broadens their horizon (Bataineh & Bataineh, 2024; Bataineh et al., 2025; Cremin & Gannon, 2024). Moreover, it plays a key role in developing learners' critical thinking, including their ability to reason logically, evaluate content, and assess the credibility of information sources (Cremin et al., 2014; Grabe & Stoller, 2019). In a society where knowledge is abundant, these skills are highly valued.

Moreover, reading develops personal as well as cultural and social identity, heightens awareness, broadens one's worldview and enhances verbal expression (AlAli & Al-Barakat, 2024; Altun, 2023). It also helps cultivate a robust appreciation of culture and pluralism that nurtures diversity, which is fundamental for the development of enlightened global citizens (Bishop, 1990; Cremin et al., 2014).

The literature shows that reading contributes to the development of critical thinking and global citizenship, as these capacities are often developed through the reflective handling of social themes and diverse perspectives (e.g., Al-Mosbahi, 2024). In light of this, educationalists have proposed that we should think differently about reading instruction in order to deepen cognitive processing, enhance self-evaluation and reflection, and increase learner involvement in learning tasks. These changes are aimed at slowly moving students from passive reading to active text interaction (Al-Barakat et al., 2025; Auh & Kim, 2024).

Reading provides each session with essential reflection and evaluation for cognitive development as reading serves to invite full mental engagement and critical analysis beyond simple knowledge transfer (AlAli et al., 2024; Al-Barakat & Al-Karasneh, 2005). This paradigm shift in teaching philosophy transforms reading instruction by shifting its focus from assessment to the development of reflective thinking skills where students learn to challenge their beliefs, reinterpret concepts, and eventually achieve independence (e.g., Al-Hassan et al., 2025). Reading functions as a developmental process which leads students to discover themselves and understand others and the world, thus enabling them to process information, analyze it and make informed choices. This model of transformation is based on reflective thinking which is more than superficial learning as a key component for cognitive development (e.g., Al-Barakat & AlAli, 2024; Flavian, 2016; Nanwani, 2021).

A combination of personal cognitive frameworks and environmental factors functions as a strong force for creativity and innovation (Al-Barakat & Bataineh, 2011; Al-Halalat et al., 2024; Al-Hassan et al., 2012; Lee & Lee, 2023). Diverse curricula and instructional methods help students create new ideas through flexible and interdisciplinary thinking. As a higher-order cognitive process, reflective thinking helps students restructure their existing knowledge by reasoning which serves as an essential characteristic of creative thinking.

Metacognition enhances learning outcomes through self-regulation and intentional reflection because it develops students into more active and engaged learners (Jassim, 2022). Metacognitive awareness enables learners to better understand their cognitive processes while they adjust their learning strategies for obstacles and take control of their academic paths (e.g., Al-Barakat et al., 2023).

Language teaching becomes more effective when children participate in literature critiques through literature circles and dialogue journals which leads to advanced linguistic capabilities that surpass basic writing skills to include interpretation and critical engagement and argumentation abilities (AlAli et al., 2024; Al-Barakat & Al-Hassan, 2009). The combination of reflective thinking with structured self-evaluation allows students to plan their analysis while making informed content choices that result in cohesive ideas leading to better communication abilities (Al-Rashidi & Aberash, 2024; Devaki, 2024). Through this educational transformation, students shift from passive information consumers to active participants because of enhanced metacognitive abilities and self-regulated learning skills (Al-Rashidi & Aberash, 2024; Nguyen, 2022) which directs education from memorization toward substantial and meaningful learning experiences (Al-Barakat et al., 2022; Bataineh et al., 2007).

Early education needs reflective thinking as a fundamental element to create students who analyze information instead of relying on memorization. Recent research indicates that these abilities do not emerge independently because students need structured educational frameworks that encourage exploration alongside inquiry and meaningful text and experience connections. The School-Wide Optimum Model (SWOM) is a framework (Swartz et al., 2007) which views thinking as an educational skill that should be taught throughout the school environment and integrates cognitive strategies from classroom lessons to institutional policies. SWOM works to create learning environments which support every thinking style. The changes involve all aspects of the school including administration, curriculum, teachers, students and overall school culture. Educational institutions must establish thinking as a core value by implementing educational practices that promote students' active participation with their knowledge.

SWOM centers on six interrelated thinking skills: questioning, comparing, predicting, generating alternatives, problem-solving, and decision-making (Swartz et al., 2007). The components work together to push students past basic memorization and toward meaningful text and idea engagement. SWOM promotes active analysis through teachers who use inquiry-driven instruction to support their students.

While prior research has applied SWOM in subjects such as mathematics and grammar at higher educational levels (Al Miqdady, 2025; Jameel, 2019), limited attention has been paid to its use in early childhood reading instruction. This gap is especially evident in Arab educational contexts, where traditional approaches are often prevalent.

This study addresses this gap by examining how SWOM may support reflective thinking during reading instruction for Jordanian five- to eight-year-old

children. Given the importance of cultivating higher-order thinking at early stages of education, especially in light of global recommendations (e.g., UNICEF, 2021), this research proposes the integration of SWOM to support inquiry, engagement and critical literacy in the foundational years of schooling.

Regardless of recent research focusing on the development of critical and reflective thinking, it seems that most work has been done on advanced levels of education or in specific subjects like mathematics or grammar. Very few studies explore the effective application of these strategies in early education, especially in the domain of reflective reading. For instance, Yasiri et al. (2019) applied the SWOM model to first-grade girls who succeeded in grammar acquisition. Likewise, Jameel (2019) noted improvement in academic performance in mathematics using the same model. Al-Barakat et al. (2023) also emphasize its impact on high school students' reflective thinking. These findings are helpful, but there is still a gap in considering how far the SWOM model can catalyze the development of reflective thinking in reading activities in early childhood.

2. Problem, Purpose, Contribution and Question

Jordan's Ministry of Education has introduced several measures to improve early childhood education. However, considerable challenges persist in teaching reading to young children, foremost among which is the lack of essential reflective skills, defined as the ability to understand, evaluate and interpret texts on a critical level. Researchers, teachers and educational supervisors alike note that reading instruction remains dominated by a focus on rudimentary skills, particularly reading aloud with speed and accurate pronunciation. Higher-order processes, such as questioning, analysis, inference and opinion formation, are essentially neglected. Consequently, reading is often reduced to a mechanical task, devoid of intellectual rigor and holistic comprehension.

This situation calls for a pedagogical shift toward more progressive teaching approaches that encourage active learning and mindful engagement with texts, thus the use of SWOM, which emphasizes the development of critical thinking through the six core skills of questioning, comparing, predicting, generating alternatives, decision-making and problem-solving. Through these core skills, SWOM potentially transforms reading from a technical skill into an active process that enables children to interact with texts meaningfully, catalyzing both independence and deeper understanding.

To the best of these researchers' knowledge, no previous research has explored the intersection of SWOM and the reflective thinking development of children aged 5 to 8. Therefore, this study aims to fill that gap by examining how SWOM can serve as a conduit for cultivating reflective thinking and text interaction through advanced cognitive strategies. Based on SWOM, this study proposes an educational model that promotes evaluative, critical and analytical thinking through reflective reading. Despite its broad potential, SWOM application remains limited in Arab educational contexts, particularly in early childhood education and language instruction.

The study aligns with UNICEF's (2021) call for the early cultivation of thinking skills as a means to improve long-term learning outcomes, positioning the

application of such a model as an urgent educational priority. It seeks to make a practical contribution by offering a design blueprint for curriculum development, teacher professional preparation and learning environments that promote deep, active student engagement and critical thinking.

Accordingly, this study sets out to determine the effectiveness of SWOM in promoting children's reflective thinking through reading instruction. It also advocates for a fundamental shift in educational practice, away from memorization and passive reception toward active meaning-making, engaging not only words but also images, multimedia, dialogue with peers and teachers, and interaction with diverse texts. In line with this vision, the study positions reflective thinking as a foundational component of quality education in the Arab world, beginning in the earliest years of schooling. This study is, therefore, guided by one research question: *To what extent, if any, is SWOM effective in fostering reflective thinking through reading among children aged 5 to 8?*

3. Method

3.1 Design

This study adopted a qualitative approach, deemed most suitable for investigating the complex and nuanced nature of education, particularly when seeking in-depth insights from participants. Unlike quantitative research, which prioritizes measurement and generalization, qualitative methods allow for interpretive exploration, an essential feature of examining how reflective thinking skills are nurtured in young children.

The primary data collection instrument was a semi-structured interview, which enabled participants to respond freely while adhering to key guiding questions. This also allowed the researchers to collect rich, non-numerical data, such as audio-recorded teacher narratives describing children's interactions with SWOM and the observable development of their thinking skills. Teachers shared detailed examples of how children engaged in questioning, comparing, predicting and offering alternative interpretations during reading activities. These narratives provided deep contextual understanding of the cognitive impact of SWOM, surpassing what could be captured through mere quantitative methods.

3.2 Participants

The study used availability sampling, selecting participants based on accessibility within the educational setting. The sample included 93 early childhood teachers from both public and private schools in Irbid, Jordan, all of whom taught children aged 5 to 8, an age range chosen for its significance in cultivating foundational cognitive and reflective abilities. To ensure credibility, multiple validation procedures were implemented: expert reviews of the instruments, peer feedback on the interview protocols, and participant checking to verify accuracy of findings. Although classroom observations were not possible due to logistical constraints, the study recommends their future inclusion for triangulation and enhanced contextual depth.

3.3 Learning through SWOM

To assess the application of SWOM in supporting reflective thinking, a phased implementation was followed, beginning with teacher training and ending with classroom evaluation.

3.3.1 SWOM Training

Reflective thinking skills were addressed through the interrelated components of SWOM. Teachers underwent a two-week training program comprising 10 hours of theoretical instruction and 10 hours of hands-on application. The training aimed to strengthen their abilities to integrate the six steps of the model into their instructional routines. The sessions combined conceptual overviews with practical activities designed to embed critical and reflective thinking into reading lessons, as detailed below.

1. **Questioning.** Teachers were trained to guide children in posing and responding to questions before, during and after lessons. These questions were designed to activate prior knowledge, spark curiosity and build deeper comprehension.
2. **Comparison.** Teachers learned how to help children identify key similarities and differences in texts or concepts, to enhance their ability to organize information and develop analytical thinking.
3. **Generating Possibilities.** Training focused on enabling teachers to support children in creatively reorganizing information, encouraging them to think divergently and develop multiple solutions to problems.
4. **Prediction.** Teachers were equipped with strategies to prompt children to make informed predictions based on textual cues and prior understanding, fostering anticipatory and inferential thinking.
5. **Problem-Solving.** The training prepared teachers to facilitate opportunities where children could draw on personal experiences and reasoning skills to tackle challenges independently or collaboratively.
6. **Decision-Making.** Teachers practiced modeling and scaffolding decision-making processes, helping children critically evaluate alternatives and select the most appropriate responses in various learning contexts.

3.3.2 Classroom Implementation

After training, teachers applied for the model for over three months. The implementation emphasized structured activities aimed at cultivating critical and reflective thinking, such as encouraging student-led and teacher-guided questioning, comparing texts and ideas, predicting outcomes of narratives or experiments, and solving open-ended tasks such as brain teasers and story-based problems. These activities supported children in engaging deeply with content and applying reflective thinking to real learning tasks.

3.4 Instrument

Semi-structured interviews served as the principal data source for examining how SWOM influenced children's reflective thinking in reading lessons. The interview guide was developed from the literature on reflective thinking and early childhood education and included both open-ended and structured questions.

To ensure validity, the guide was reviewed by a panel of experts in education, curriculum and early childhood studies. Feedback led to multiple revisions for clarity, alignment and focus. A pilot study was also conducted with teachers outside the main sample, further refining the guide.

The interview comprised questions such as *How did the model influence the children's reflective thinking during reading?*, *how did comparison tasks help children recognize similarities or contrasts in the text?*, *were students able to make predictions based on what they read?*, and *how did thinking tasks support decision-making processes?* The data was coded thematically, aligned with the research objectives, and analyzed to capture the complexity of participants' experiences.

3.5 Data Collection

Participants were early childhood teachers with experience in reading instruction and interest in applying SWOM. Participation was voluntary, and teachers were contacted in advance and fully briefed on the objectives, procedures and ethical safeguards of the research.

Interviews took place in school settings to ensure comfort and authenticity. Each session lasted 50 to 60 minutes, followed a structured guide and was audio-recorded with participant consent. The process spanned one month and was timed to avoid class disruption. Transcripts were verified against recordings, and clarifications were requested when needed. Field notes documented contextual observations, non-verbal cues and emerging themes.

All data, audio files, notes and transcripts, were securely stored in password-protected digital folders. Participants were anonymized using coded identifiers to maintain confidentiality throughout the analysis and subsequent reporting.

3.6 Ethical Considerations

The authors adhered to ethical protocols appropriate for research involving young learners. Key procedures included:

1. Informed Consent: Teachers were briefed and provided voluntary written consent.
2. Confidentiality: Personal identifiers were removed, and all data was handled securely.
3. Privacy: No identifying information was included in published findings.
4. Child Safeguarding: All instructional activities followed ethical and pedagogical standards to protect child well-being.
5. Parental Approval: Permissions were obtained for student participation in the instructional components of the study.

3.7 Data Analysis

Data was analyzed using grounded theory. After transcription, open coding was applied to identify initial patterns related to reflective thinking and SWOM implementation. Codes, such as questioning, comparison and prediction, were clustered into higher-order categories, such as deepening comprehension, promoting critical thinking, enhancing prediction and strengthening reasoning through inquiry.

Multiple coding cycles ensured the validity of the data and the saturation of the themes. A descriptive summary was then prepared, supported by illustrative excerpts from the interviews, to synthesize findings in line with the question of the research.

4. Results

This study aimed to assess the effect of the SWOM model on developing children's reflective thinking skills. In pursuit of this aim, data was gathered through semi-structured interviews. The data was analyzed through grounded theory which incorporated open coding, categorization and thematic synthesis of the participants' responses. Several key themes emerged from the analysis, as shown in Table 1 and detailed below.

Table 1: Overview of Principal Emerging Themes from Participant Responses

No.	Theme	n	%	Key Outcome
1	Deepened Mental Processing Skills	92	98.92	Enhanced critical thinking, prediction and interpretive reasoning
2	Enhanced Analytical and Inferencing Abilities	92	98.92	Shift from surface-level recall to inferential and causal reasoning
3	Improved Analytical Engagement with Texts	91	97.84	Advanced analysis of narrative structure and symbolic meaning
4	Improved Attentiveness and Analytical Thinking	90	96.77	Improved visual focus, detail orientation and initiation of inquiry
5	Enhanced Visual Perception	88	94.62	Ability to link visual elements and understand context
6	Improved Visual Literacy	86	92.47	Deeper image interpretation based on narrative and context

n = 93

The following themes, supported by participant excerpts, demonstrate how the model affected young learners' reflective thinking in reading and interpreting texts across various levels.

4.1 Deepened Mental Processing Skills

Analysis of the interview data revealed that deep mental processing was a key outcome of SWOM. A sweeping 92 out of the 93 participants (98.92%) reported that the strategy markedly improved children's use of critical and analytical thinking when interpreting texts, as revealed in the excerpts below.

I used to notice that children would give surface-level answers to questions, but after using SWOM, they began asking themselves questions like: Why did the protagonist act this way? Could there have been alternative actions?

Once in a reading class, a girl remarked: Do you believe the conclusion of this story was just? She replied: No, because the other character did not have the opportunity to explain, and the proof is that she wasn't there during the pivotal moment.

Some students started to reject the writer's position or offer other possible interpretations of the plot. This was new to me. Now, for some reason, they defend their statements with evidence from the text.

These excerpts point to a clear shift toward a higher level of analysis, where children move beyond basic interaction with input to engage in active discussion, argumentation and sophisticated mental processing, including priming, predicting and delving into deeper layers of textual meaning. The model reportedly reshaped the mental framework through which children approach reading, shifting them from passive absorption to critical evaluation of information.

4.2 Enhanced Analytical and Inferencing Abilities

SWOM was reported to develop children's logical thinking and analytical skills in the context of text interpretation. According to the findings, 92 out of 93 participants (98.92%) affirmed the positive effect of the model, as illustrated in the excerpts below.

With SWOM questions, children started asking the more specific Why associated with the actions of characters, a previous gap that had not been filled.

I observed that children no longer simply recite texts. They started to reason about the motives of the characters, meaning there was analytical thinking being switched on.

In one of the lessons, one child mentioned, 'I think the character did this because she was scared, and the evidence is that she hid afterward.' Such reasoning was absent without SWOM.

These excerpts illustrate a marked shift in how children responded to reading texts, as they moved beyond basic comprehension toward deeper analysis and logical reasoning. SWOM reportedly affected their engagement by prompting them to explore underlying meanings and pose reflective questions, such as *Why did the text say that?* or *How does this information support the main idea?*.

4.3 Improved Analytical Engagement with Texts

Data analysis revealed that 91 respondents (97.84%) indicated that SWOM contributed to more meaning-oriented reading lessons by helping children decode textual meanings and contextualize events in multiple ways. The following sample excerpts are indicative:

During the lesson about the senses, we read the sentence: 'The sky was overcast, and the boy was sad.' A student gave her interpretation instead of a metaphorical meaning. Clouds and sadness... maybe the weather mirrors what the boy feels. She surprised me!

Now the child reads the paragraph and gives his account of the text in novel language with real life examples as though he gives his version of telling back the text.

Some students now analyze a key aspect of the text which is the contrast between the text itself and the message that the text communicates...and use relevant evidence to support their claim.

These excerpts illustrate a shift in how children approach texts during reading lessons, moving beyond surface-level comprehension toward deeper, nuanced forms of analysis. SWOM reportedly encouraged this progression by prompting analytical questioning and evidence retrieval, which ultimately enabled children to interrelate textual components and understand the structure and interconnectedness of ideas within and across texts.

4.4 Improved Attentiveness and Analytical Thinking

Analysis of the interview data showed that 90 participants (96.77%) reported notable improvement in children's visual perception skills during the implementation of SWOM, particularly in concentration, attention to detail and visual analysis. The model was reported to contribute to a visually engaging learning environment where children became active participants in exploring texts and images rather than passive observers. Through open-ended questioning and guided comparisons, children were reportedly encouraged to notice and reflect on subtle details that might otherwise go unnoticed, as evident in the following excerpts:

Before applying SWOM, children would glance at the pictures quickly, but now they stop and ask: Why is this character frowning? Is something sad happening?

I noticed that children began to connect the changes in the background with the mood shifts in the story, something that didn't happen before.

A first-grade child amazed me when he pointed out that there was a shadow in the corner that wasn't visible in the previous page, and asked: Where did this shadow come from?

These responses suggest that SWOM activated what can be described as intentional visual awareness, where children moved beyond automatic observation to questioning and reanalyzing what they saw. This behavior reflects a rare level of reflective thinking for this age group and indicates that the strategy effectively stimulated sensory awareness and connected it to analytical thinking, which potentially enabled deeper textual understanding.

4.5 Enhanced Visual Perception

Data analysis showed that 88 participants (94.62%) confirmed that the model helped children move beyond mere attention to details to recognizing relationships between these details and interpreting them within a broader context, as illustrated in the excerpts below.

In a lesson on a comic story, the children connected the colors of the sky in the background to the time of day in the story, saying that the story started at sunset.

They used to treat each image as a separate world, but now they try to link one image to another and analyze the progression of events through the pictures.

One child noticed that the arrangement of images in the story suggests the passage of time, and the characters change positions based on the events in the story.

These excerpts demonstrate that children began to develop a more mature visual perception, extending beyond spontaneous observation or superficial description of what they saw. The use of SWOM not only improved their ability to recognize visual elements but also played a crucial role in expanding their understanding of the meanings conveyed by images, which could only be interpreted in light of the textual or narrative context. This shift indicates that children no longer see the image as a mere decoration complementing the text but rather as a message that requires interpretation and comprehension.

4.6 Improved Visual Literacy

SWOM was reported to be effective in helping children interpret visual information not just by recognizing shapes but rather by connecting visual elements to the narrative or interpretive meaning of the text. Analysis of the data revealed that 86 participants (92.47%) observed noticeable progress in the children's ability to offer thoughtful, context-based visual interpretations, as reflected in the excerpts below.

Children's observations now reflect a deeper understanding, for example: this character looks tired because his eyes are half-closed, and his face is pale.

In one lesson, a child interpreted the symbols in the background of the image as representing danger, and indeed, the narrative later developed to confirm this.

One child linked the size of a character in the picture to their role in the event, stating that the larger size indicates a bigger role.

These excerpts illustrate a qualitative shift in how children interact with visual elements in reading texts. Images or drawings are no longer seen as mere aesthetic addition to reading texts but rather as meaningful components that are read, analyzed and connected to the verbal content to achieve a more integrated understanding. Through the model, children are reported to actively interpret images and link visual details to the ideas conveyed in the written text.

5. Discussion

The findings suggest that SWOM had a clear and constructive effect on children's thinking skills. A significant majority, approximately 99 percent of participants, reported observing notable improvements in children's visual perception, especially in their ability to focus, notice detail and analyze relationships among elements. These developments seem to stem from emphasizing interaction and exploration. Through questioning, comparing and predicting, children were not merely observing texts or images but rather actively engaging with them. Such activities demanded thoughtful perception, drawing children's attention to features that may otherwise be overlooked. The ensuing depth in visual and analytical thinking became increasingly visible during reading lessons.

Looking closely at feedback from participants, reflective thinking stands out as one of the most noteworthy benefits gained during the reading lessons. Almost every participant remarked upon the higher level of cognitive alertness and engagement among children. Rather than passively watching or listening to the lesson, learners were said to engage more meaningfully with both the visuals and the texts. Rather than just noticing, they interpreted and extracted meaning from the text by synthesizing various elements.

This development supports important pedagogical and psychological ideas, including the necessity of encouraging reflection through interactive teaching, the most notable of which is Piaget's cognitive development theory. Within this stage of development, children are able to understand much more when they are given the opportunity to engage intellectually, which is possible with the model's created environment.

These findings also support a body of literature (Khasawneh et al., 2022; Salih, 2024; Yasiri et al., 2019) which indicates children's visual perception can be enhanced through guided exploration of SWOM. These studies indicate the effectiveness of active learning tasks, such as questioning, comparison, and analysis, toward the development of reflective and analytical thinking. A shift in pedagogical strategies can enable children to engage in reading in a more critical and comprehensive way.

Children's development of visual awareness is one of the outcomes that was most consistently reported. It was noted that children were no longer capturing images as headshots. Rather, they were attending to colors, the arrangement of spatial layouts, and the relevant narratives within the visuals. This aided in shaping their formative development of interpretations regarding events and characters. For instance, some children were able to recognize emotional cues in illustrations, which influenced their understanding of the text and story's context. Also, some children interpreted background details in the drawings as symbolic, thus demonstrating developing abstract reasoning. In a context of the contemporary educational environment, where children are surrounded with multimedia, critical examination of images is an integral part of reading skills.

These findings support the work of other researchers (Al-Ghamdi, 2019; Khasawneh et al., 2023) who argue that SWOM enhances children's skills in visually reading and critiquing SWOM. These researchers argue that teaching children to read images meaningfully enhances one's understanding and evaluation of visual information in different contexts.

Findings also mentioned that children were beginning to reinterpret scenes more symbolically and imaginatively as illustrations. This indicates that those children had moved past literal illustrations to more abstract and conceptual understanding. For instance, children began identifying faces with half-closed eyes and pale face as signs of exhaustion or sadness. Children were also asked to interpret picture backgrounds as symbolically pertaining to the narratives, demonstrating their understanding of visual analysis, in both the imagery and the words written, as well as the relationship between the two.

This development can most likely be explained by the focus of SWOM on creating a relationship between visual input and the corresponding text because the model seeks to balance what learners see with what they read and therefore enables learners to understand on a deeper level. Such results reinforce overall educational aspirations, including those that situate picture brick as the apex of reason, logic and higher order skills. Hussein and Mater (2020), for instance, studied this phenomenon and found that children exposed to models such as SWOM become more skillful at interpreting integrated visual and textual materials.

The findings also showed that children's cognitive development seemed to go further than visual reasoning based analysis. Participants noted that children started to pose critical level questions, like, *Was the story's ending justified? or Could the character have behaved differently?*. Such questions indicate that children were not only grasping the gist of the story, but also analyzing character motivation and considering counterfactual outcomes, which indicates progress towards complex analytical reading skills.

These findings support cognitive development theories, especially that of Piaget's, which highlighted the need to give children the chances to evaluate and analyze decisions, actions, and relationships within a given context. They also support the conclusion of Al-Mosbahi (2024) that teaching models like SWOM are capable of developing children's story interpretation skills and their ability to draw logical inferences, which is a critical step in their cognitive development.

Reportedly, refinement in reasoning ability came with progressing through treatment. This has been reported in SWOM with structured comparison and inference tasks wherein participants situated meaning beyond the text with questions like *Why did the character behave in such a manner? or What is the importance of this particular detail?*. These learners progressed beyond the rote level of understanding and were beginning to interpret meaning through purposeful, analytical reading.

The findings from the current study support past SWOM studies (Al-Karasneh et al., 2025; Daoud & Aledwan, 2018; Fraihat et al., 2022) highlighting the enhancement of children's logical reasoning and text interpretation skill where, in this case, SWOM is proven to strengthen children's text reasoning skill along with thinking skill. It demonstrates that young learners can develop sophisticated cognitive skills when provided with proper opportunities, such as applying structured critical thinking tasks.

The more comprehensive developmental impact confirms SWOM's effectiveness as a framework for not only cultivating analysis and perception skills, but for enhancing children's grasp of the world. Improvements noted in reasoning, synthesis, and articulation highlight the importance of intellectual habits developed through inquiry-based instruction.

It was noted that children were actively involved in the knowledge construction process through connection-making, interpretation of various symbols, and meaning extraction from both images and written text. This level of participation

fosters emerging independent thought and aligns with the current policy direction that seeks to better position the learners within an information-dense and complex global environment.

It is also vital to highlight the teacher's role in achieving these outcomes, as the success of the SWOM model relies on teachers who are both knowledgeable about the framework and sensitive to children's cognitive development and natural curiosity. Teachers who implemented the model effectively were reportedly able to build classroom environments that encouraged reasoning, interpretation and symbolic thinking.

The current findings suggest that SWOM offers a comprehensive framework for advancing learning in the early years. By integrating multimodal content with an analytical and reflective teaching approach, it supports intellectual growth across multiple domains. These findings affirm that instructional practices grounded in exploration, critical inquiry and active engagement contribute not only to academic development but also to foundational thinking skills, skills that children carry forward in both school and life beyond.

6. Conclusions, Implications and Future Directions

This study provides compelling evidence that SWOM can significantly enhance children's reflective and analytical thinking skills. Teachers observed marked progress in how children approached reading, particularly in their ability to interpret visuals, connect them meaningfully to texts, and engage in deeper levels of analysis. The shift from surface-level understanding to more multi-faceted thinking highlights the effectiveness of the model in cultivating essential cognitive skills in the early years.

These findings contribute to the growing literature on critical thinking in early childhood education, underscoring the value of structured pedagogical models that prioritize reasoning and interpretation. The results are also consistent with Piaget's theory, which advocates for cognitively appropriate stimulation to support children's conceptual growth and self-directed learning.

Given these insights, it is strongly recommended that SWOM be integrated into early childhood curricula, particularly within preschool and primary-grade contexts. Classrooms should be designed to promote a culture of inquiry, analysis and active meaning-making rather than passive consumption of information. To better assess children's cognitive growth, traditional assessment practices should be expanded, as teachers are encouraged to incorporate reflective thinking assessments, classroom-based observations and structured performance tasks to gain a more accurate picture of children's evolving reasoning skills.

While this study presents promising findings, it is important to acknowledge its limitations. The use of an available sample, limited to early childhood teachers within one educational context, restricts the generalizability of the results. In addition, relying solely on self-reported data may lead to partial or biased perspective, as responses reflect participants' perceptions rather than independently observed behaviors. The absence of methodological triangulation, such as classroom observations or student work analysis, further

limits the depth and verifiability of the findings. Research involving more diverse and representative samples, alongside the use of multiple data sources, is needed to corroborate the current conclusions.

Future research should explore the long-term effect of SWOM on children's cognitive and reflective development across different educational stages and contexts. Comparative studies evaluating this model and other interactive teaching frameworks would also help identify context-specific best practices. Moreover, in light of contemporary shifts toward digital learning, examining how SWOM might be adapted for use with multimedia and interactive platforms would provide valuable direction for classroom innovation. To support both researchers and practitioners, reliable tools for assessing reflective and analytical thinking in young learners are gravely needed.

The findings and recommendations presented here offer a strong foundation for further work in this field. Educators, curriculum designers, and researchers are called upon to consider SWOM as a practical and theoretically grounded approach to instilling higher-order thinking skills in early learners. In doing so, they not only enrich classroom practice but also contribute to a broader educational vision that values inquiry, independence and critical engagement from the earliest years of schooling.

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