International Journal of Scientific Advances
ISSN: 2708-7972
Volume: 7 | Issue: 3 | May – Jun 2026 Available Online: www.ijscia.com
DOI: 10.51542/ijscia.v7i3.6

Value Added to an Image and Pupils' Socio Cognitive Development

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ABSTRACT

This study is titled "value added to an image and pupils' socio cognitive development". Visual literacy education is lagging, as pupils are rarely provided with learning experiences that enable them to select and interpret meaningful visual phenomena from their environment. In addition, the manner in which these learning experiences are delivered often does not promote meaningful interaction between learners and what they observe. Instructional materials are frequently not designed in ways that allow pupils to construct meaningful visual statements or to practise organising their ideas visually, and they are often inadequate. The purpose of the study was to reinforce the effective use of visual materials in the classroom, to identify pupils' learning styles and to promote active visual learning among learners. The question here is, does the value added to an image have an effect on pupils' socio-cognitive development? It was hypothesised that there is a significant relationship between the value added to an image and pupils' socio-cognitive development. A quasi-experimental research design, specifically a nonequivalent group design, was used to collect data from a sample of 75 Nursery Two pupils of Mario Academic Complex, Mendong. A test served as the main instrument for data collection, and the data obtained were analysed using repeated measures analysis of variance. The results showed a significant effect for value added to an image, $F(1, 73) = 224.280$, $p < 0.001$, partial $\eta^2 = 0.754$, as well as for the interaction between value added and group, $F(1, 73) = 28.201$, $p < 0.001$, partial $\eta^2 = 0.279$. These findings reveal a strong and significant effect of the experimental factor. The results were interpreted using Vygotsky's Sociocultural Theory (1978) and Paivio's Dual Coding Theory (2006), which explain how children construct knowledge through social interaction and how the brain processes verbal and visual information through different but interconnected systems.

Keywords: value added; image; pupils; socio-cognitive development visual literacy; image interpretation

1. INTRODUCTION

The presence of visual elements in contemporary teaching and learning is increasing as the integration of images and visual presentations with text in textbooks, instructional manuals, classroom presentations, and computer interfaces continues to expand (Benson, 1997). Print (text) is not yet dead, nor will it become extinct; nevertheless, our language-dominated culture has gradually shifted toward the iconic. Much of what we know and learn, what we buy and believe, and what we recognise and desire is increasingly shaped by the dominance of the human psyche by the photograph. Visual literacy as a movement can be traced back to John Debes, who worked for the Eastman Kodak Company in Rochester, New York, and who coined the term *visual literacy* in the late 1960s. Later, Debes, along with Clarence Williams and Colin Murray Turbayne, formed a group known as the Rochester School, which laid the foundation for the visual literacy movement. By 1969, the International Visual Literacy Association (IVLA) was created. According to Debes (1966), visual literacy refers to a group of vision competencies that a human being can develop through seeing and, at the same time, integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret visible actions, objects, and symbols, natural or man-made, that he or she encounters in the environment. Through the creative use of these competencies, individuals can comprehend and appreciate the masterworks of visual communication.

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interpret visible actions, objects, and symbols, natural or man-made, that he or she encounters in the environment. Through the creative use of these competencies, individuals are able to comprehend and appreciate the masterworks of visual communication.

There is a widespread belief now increasingly challenged by research that visual viewing is a passive activity in which viewers are only superficially reactive and that it may hinder or displace academic achievement. However, recent studies suggest that viewing is an active cognitive process, described as "an ongoing and highly interconnected process of monitoring and comprehending" and "a complex cognitive activity that develops and matures with the child's development to promote learning" (Marshall, 2002, p. 7). Mayer (2001) further explains that viewing, although it may appear passive, can involve the high-level cognitive activity necessary for active learning. Well-designed visual instructional messages can promote active cognitive processing in students, even when learners appear behaviorally inactive. Both content and context are essential for engaging students as active learners. Content should be age- and skill-appropriate, as what one watches may be a stronger determinant of academic success than the amount of time spent watching television (Stanovich & Cunningham, 2004). Visuals have been shown to engage students in active learning by addressing multiple intelligences, using multiple modes of content delivery, and appealing to learners' emotions.

According to Gardner's theory of multiple intelligences (2006), individuals possess, in varying strengths and preferences, at least eight distinct intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalistic. Marshall (2002) explains that the strengths and weaknesses among these intelligences influence how individuals process information, perceive the world, and learn. This represents a significant departure from the traditional view of intelligence, which primarily emphasises verbal and computational abilities (Brualdi, 1996). Gardner's theory suggests that the way subject matter is presented influences learners' ability to understand and retain information, and that teachers should consider all intelligences when designing instruction (Brualdi, 1996). While traditional textbooks rely mainly on linguistic approaches, media can incorporate multiple modes such as aesthetics, narration, and logic in addition to language, thereby addressing a broader range of learners.

Communicating with images is an ancient practice. Early humans discovered that making pictures provided a form of visual communication through symbolization, which differs in important ways from other symbolic systems (International Visual Literacy Association, 2001). Society has since advanced, developing sophisticated communication technologies such as newspapers, television, and digital networks. The idea of communicating with images is well known among educators. Griffin and Schwartz (1997, p. 40) state that "by the mid-1980s the notion that images are more potent than words… had been repeated often enough to become accepted wisdom." Although widely accepted, this idea has not always been effectively applied in educational practice.

In the 21st century, the conceptual age is flooded with images and illustrations of all types. Pupils need to know how to read and interpret these images. Genetically, every individual possesses a unique capacity for critical analysis and judgment; however, the main difference lies in the level of its development. The contemporary era is characterised by the increasing importance of critical thinking skills. Pupils are often not provided with learning experiences that allow them to select from their environment visual phenomena that are meaningful to them. In addition, the manner in which these learning experiences are delivered does not consistently provide opportunities for meaningful interaction between learners and what they observe. Most often, instructional materials are not designed in a way that enables pupils to create meaningful visual statements or to develop systematic practice in organising their ideas visually. Furthermore, instructional materials are frequently inadequate. As a result, visual illiteracy persists in education. Embracing visual literacy education represents a transformation into the digital and media era, explicitly teaching a set of competencies that will help pupils think through, think about, and think with images. This is possible because visual messages capture learners' attention, communicate quickly and effectively, and have the capacity to produce desired learning outcomes. It is for these reasons that the researcher seeks to investigate how visual literacy education contributes to the socio-cognitive development of pupils.

2. LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1. Views of Visual Literacy

The term *visual literacy* was coined in 1969 by John Debes, an employee of the Kodak Company and a founding member of the International Visual Literacy Association (IVLA). According to Debes (1969), visual literacy refers to:

"A group of vision competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or fabricated, that he encounters in his environment. Through the creative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication" (Debes, 1969).

Since then, the term has been defined, revised, and redefined according to the perspectives of different scholars and practitioners. Messaris (1994) defines

visual literacy as "the gaining of knowledge and experience about the workings of the visual media coupled with a heightened conscious awareness of those workings." Similarly, Kress and Leeuwen (1997) distinguish between what they describe as the "old literacy" and the "new literacy." They argue that conventional literacy, the ability to read and write, is itself based on the visual recognition of abstract symbols combined to create meaning. Thus, literacy has always been visual in nature; however, emerging forms of communication require new approaches, leading to what they term a "new literacy." Bamford (2005) defines visual literacy as the development of skills necessary to interpret visual images, examine their social impact, and discuss their purpose, audience, and ownership. According to Bamford, visual literacy also includes the ability to visualise internally, communicate visually, and critically evaluate the accuracy, validity, and value of images. Earlier, Bamford (1997) explained that a visually literate person is capable of interpreting visual objects and images, creating visuals, appreciating visuals created by others, and mentally visualising objects. She further emphasises that effective communication in the modern world requires the ability to interpret, create, and select images capable of conveying diverse meanings.

Elkins (2008), an art educator, historian, and critic, advocates for an undergraduate curriculum in visual learning. He explains that the phrase *visual literacy* itself suggests the idea of "reading" images. Elkins argues that terms such as *visual competence* or *visual skills* are insufficient because visual literacy extends beyond technical abilities to include politics, ideology, and history. His perspective highlights the broader cultural and social dimensions of visual literacy. A similar perspective is presented by Neil MacGregor Kennedy (2010), President and Director of the Toledo Museum of Art. In a presentation at Dartmouth College, Kennedy defined visual literacy as "the ability to construct meaning from images." He explains that visual literacy is not merely a skill but rather a form of critical thinking that enhances intellectual capacity through the use of various interpretive skills. Serafini (2014) defines visual literacy as "the process of generating meanings in transaction with multimodal ensembles, including written text, visual images, and design elements, from a variety of perspectives to meet the requirements of particular social contexts." These various definitions illustrate the multiple dimensions associated with visual literacy and demonstrate how the concept has been interpreted differently across disciplines. No single or simple definition fully captures its complexity. For this reason, the assessment of Donis A. Dondis (1973) remains relevant. During the early stages of the visual literacy movement, Dondis argued that "the major pitfall in developing an approach to visual literacy is trying to overdefine it." With this in mind, it is perhaps more useful to focus on areas of convergence among scholars. Avgerinou (2009), a leading scholar in visual literacy research, identified several common principles through a research project known as the *Delphi Study*. Drawing on the views of numerous visual literacy practitioners, she concluded that visual literacy:

- Is both a cognitive and affective ability.
- Can be described as an ability, skill, and competency.
- Includes the ability to encode (write) and decode (read) visual communication.
- Consists of skills that are teachable and learnable.
- Is interconnected with other sensory skills.
- Incorporates theories from a variety of academic disciplines (Serafini, 2014).

Another important dimension of visual literacy is *visual thinking*, which extends beyond digital proficiency into expressive and cognitive development. Visual thinking promotes "whole-brain" learning and demonstrates why digital competence should be integrated with manual dexterity and creative expression. Understanding visual literacy also requires situating it within the broader framework of the "21st-century literacies." Renee Hobbs explains that new forms of texts and literacies have emerged over the past several decades. These include information literacy, media literacy, media education, visual literacy, news literacy, health media literacy, and digital literacy. Each reflects distinct scholarly traditions and educational practices while emphasising the broad range of knowledge and skills required in contemporary society. Among these emerging literacies, visual literacy is especially interconnected with media literacy and digital literacy, making it an essential competency in today's technologically driven world.

2.1.2. Visual Literacy Pedagogy

How do we find ourselves in an educational climate that fails to fully understand and therefore resists widespread visual literacy education? Although there are isolated and targeted educational programs that address visual literacy, there is still no broad recognition of the critical importance of visual literacy training for all learners. Contemporary educational systems place significant emphasis on STEM education. While there is indeed a strong need for a population trained in science, technology, engineering, and mathematics, innovation may be hindered if education neglects the visual dimension, which contributes an essential component to STEM learning. A movement toward transforming STEM into STEAM by incorporating the arts into educational agendas has begun to emerge; however, it continues to face resistance and, in some cases, apathy. This situation raises important questions regarding what remains misunderstood about visual literacy and its educational significance. A common misconception has been reinforced by Prensky's (2001) influential paper *Digital Natives, Digital Immigrants*. Addressed primarily to educators, the paper argues passionately that teachers must incorporate "digital native" methodologies into their instructional practices if they wish to engage students who have grown up surrounded by digital screens.

Over time, the paper contributed to the popular belief that there exists a divide between those who were raised with digital technology and those considered "digital immigrants," who experienced life before the rise of the Internet, social media, and rapidly evolving digital technologies. However, this distinction has often been interpreted to suggest that digital natives possess a deeper understanding of digital environments simply because they are more comfortable navigating them. While digital natives may indeed show less fear toward technology and adapt more quickly to technological innovations, this does not necessarily mean that they critically reflect upon the social and cultural implications of these technologies. Critical analysis of visual and digital media is not automatic for either digital natives or digital immigrants; rather, it requires deliberate training and education.

Scholars and visual theorists contend that visual literacy is essential for understanding how society and individuals are shaped within an image-rich media environment. Kellner (1995) argues that media culture has become a major source of public education. According to Kellner, "In a contemporary media culture, the dominant media of information and entertainment are a profound and often misperceived source of cultural pedagogy: they contribute to educating us how to behave and what to think, feel, believe, fear, and desire and what not to" (p. 5). He further emphasizes that "media culture is a culture of the image" (Kellner, 1995). Kellner clearly highlights the immense influence media images exert on shaping both individuals and society. Similarly, reflecting on contributions included in his book *Visual Literacy*, Elkins (2008) asserts that "without confronting the way in which visual texts are produced and consumed, one cannot understand the practices of modern social life" (p. 1). Kress and Van Leeuwen (1997) make a compelling argument for the teaching of visual literacy in their work. They examine how contemporary society arrived at its current communication practices and analyse the socio-political implications of visual communication. Most importantly, they emphasise the urgency of visual literacy education. In their revised edition published in 2006, Kress and Van Leeuwen explain that young children naturally express themselves visually through drawings, illustrations, and images. However, as children progress through formal schooling, visual expression is gradually replaced by written text, and the visual becomes limited to more technical functions such as maps and diagrams. Writing becomes the dominant and expected mode of communication. Although writing itself represents a form of visual literacy, it relies on a high degree of abstraction. Consequently, Kress and Van Leeuwen (2006) refer to traditional textual literacy as the "old visual literacy."

Kress and Van Leeuwen (2006) further observe that much of modern communication is conveyed through sophisticated multimodal texts, yet schools rarely teach students how to analyse or create such texts. Remarkably, their observations were made even before digital screens became as widespread as they are today. They argue that, "in terms of this essential new communication ability, this new 'visual literacy,' institutional education, under the pressure of often reactionary political demands, produces illiterates" (Kress & Van Leeuwen, 2006, p. 3). They contend that there remains an underlying resistance to recognising the visual as a legitimate and complete mode of representation. Furthermore, they predict that visual communication will increasingly move beyond the domain of specialists and become an essential competency for all individuals. According to them, the inability to be visually literate may eventually attract social and professional disadvantages, particularly in the workplace. In light of these developments, Kress and Leeuwen (2006) argue that society is transitioning from the "old literacy," in which images were subordinate to language, toward a "new literacy," where images exist alongside written texts and often function independently. They question whether language alone remains sufficient in a world characterised by increasingly vast and complex information. Instead, they suggest that multimodality is necessary for effective communication and understanding. Consequently, there is a growing need for a vocabulary and framework capable of analysing visual representation and supporting the teaching of visual literacy.

Scholar James Paul Gee also strongly advocates for the development of skills in analysing images and other modes of meaning-making in order to navigate modern media environments effectively. In his foreword to *Reading the Visual*, Gee argues that contemporary society is fundamentally multimodal. Language represents only one mode of communication, while images, sounds, actions, and physical interactions constitute other important modes. Gee maintains that in the twenty-first century, anyone unable to function within multimodal environments is effectively illiterate. More importantly, individuals must develop critical and analytical abilities because modern media environments—comprising games, applications, news, and social media—make it easier than ever to deceive, manipulate, and misinform audiences (Serafini, 2014). As Gee suggests, society now exists within a multimodal world. Consequently, educators must challenge the fear that visual communication will replace traditional reading and writing. Advocating for visual literacy education does not imply rejecting textual literacy. Proponents of visual literacy consistently emphasise that visual literacy complements rather than replaces conventional literacy skills. Written language continues to play a powerful role in meaning-making; however, the ability to interpret written texts alone is no longer sufficient in a world where meaning is increasingly communicated through images. Kellner (1998) supports this perspective by arguing that educational systems should embrace multiple literacies. According to him, the issue is not one of choosing between print literacy and multimedia literacy, but rather integrating both approaches in ways that preserve the strengths of traditional

education while also developing new literacies necessary for engaging with emerging technologies. Ultimately, words and images complement one another, creating deeper and more complex meanings that require increasingly sophisticated critical interpretation.

2.1.3. Reception of Images and Socio-Cognitive Development

In an age increasingly dominated by images, it has become imperative to understand how the visual processing system functions, how visual cognition is shaped by cultural and social influences, and how visual messages are intentionally designed to elicit specific responses. Referencing the earlier quotation from Confucius, one important reality that remains insufficiently recognised is that visual literacy must be learned. Seeing is a highly complex cognitive process. Contrary to popular belief, seeing is not merely a physiological activity; rather, it is a combination of physical and mental processes. Current cognitive research indicates that the human information-processing system consists of three major memory structures: sensory memory, working memory, and long-term memory (Malamed, 2009). Light reflected from an object or emitted from a screen reaches the retina and forms an image that is briefly retained in sensory memory. The image is then transferred into working memory, where it becomes part of conscious awareness and is integrated with existing knowledge for encoding. At this stage, the brain determines whether the image is familiar, whether it can be compared with prior knowledge, and whether it can be recognised and categorised. This stage gives rise to perception. The aspects of the image that receive focused attention and are successfully encoded are subsequently stored in long-term memory, from which they can later be retrieved.

Thus, "seeing" involves understanding and assigning meaning to external stimuli. Cognitive researchers describe these processes as "bottom-up" and "top-down" processing. Visual awareness originates from external stimuli through bottom-up processing, whereas top-down processing is guided by memories, expectations, and intentions. According to Malamed (2009), visual perception results from the interaction of these two processes. Bottom-up processing facilitates pattern recognition, while top-down processing refocuses attention and reinforces relevant information. In essence, individuals "see" not only with their eyes but also with their minds. A fundamental aspect of visual literacy is the recognition that seeing is deeply influenced by social, political, and cultural conditioning. Metros (2006), Associate Vice Provost and Associate Chief Executive Officer for Technology Enhanced Learning at the University of Southern California, argues that educational institutions must create spaces where ethical issues related to a visually dominated world can be critically examined. She emphasises that students should be taught to critically analyse images and representations, investigate their sources, and question their claims to truth. One of the primary objectives of visual literacy education is therefore to encourage critical analysis of visual communication by equipping learners with tools that enable them to understand and manage this complex activity. An image presented to a pupil immediately captures attention and stimulates observation. Learners examine the image carefully, identify relevant details, and select meaningful information based on perception. The more attractive and engaging the image, the greater the learner's motivation and receptivity.

Research further demonstrates that information stored in sensory memory lasts only a few seconds. Consequently, visual thinking often depends on visual aids (Ware, 2008). Drawing as a means of extending thought is frequently confused with drawing intended merely to communicate a completed idea. McKim (1972) distinguishes between graphic ideation and graphic communication, explaining that graphic ideation helps individuals develop visual ideas worth communicating. Educational systems that emphasise graphic communication without encouraging graphic ideation may unintentionally hinder visual thinking. Visual literacy commonly involves two principal components: first, the ability to interpret visually presented messages such as images or multimodal texts (decoding), and second, the knowledge and skills necessary to communicate ideas effectively through visual means (encoding). The latter requires familiarity with principles of design, presentation, human perception, and cultural diversity. However, there exists a third component known as visual thinking. Visual thinking involves the use of "whole-brain thinking" and the capacity to express ideas visually through sketches, diagrams, and drawings. Simple illustrations and doodles can often communicate ideas more effectively than verbal explanations alone. Visual thinking also enables individuals to externalise their thoughts for reflection, comparison, and further development. The combination of cognitive activity and the physical act of sketching has been shown to improve concentration, reinforce ideas, and enhance problem-solving abilities. From prehistoric cave paintings to modern visual representations, humans have always been "mark-makers." Cognitive research on visual thinking demonstrates that drawing practices support creativity and conceptual development.

Society has evolved from the Industrial Age (1840–1950) to the Information Age (1950–present), and many scholars now argue that humanity is entering the Conceptual Age (Pacione, 2010). This emerging era emphasises creativity and innovation. Neurological and cognitive research has shown that different regions of the brain process different forms of information and work collaboratively during complex activities. Pink (2005) describes this shift as the emergence of "a whole new mind," inspired by Samuel Taylor Coleridge's belief that "a great mind must be androgynous." Similarly, Sperry (1970) and his colleagues uncovered the concept of left-brain and right-brain specialisation.

Although later studies demonstrated that the brain does not function through a strict dichotomy, research confirms that different regions specialise in distinct activities. The left hemisphere is generally associated with logical, analytical, and language-based functions, whereas the right hemisphere is linked to intuition, emotion, and image processing. Effective visual thinking, therefore, involves integrating both hemispheres to create meaning, recognise patterns, and solve problems creatively.

Research by Childers and Houston (1984) on the Picture Superiority Effect demonstrated that visual imagery serves as a powerful mnemonic device that enhances learning and memory retention more effectively than rote verbal rehearsal. Their concept of "redundant cues" suggests that imagery provides additional semantic information beyond the original stimulus, thereby improving memory performance. This finding illustrates why visual literacy is essential in education. Further research indicates that information is more easily retrieved when it is encoded through multiple channels, such as images, text, music, and emotional associations. In an era characterised by information overload, combining multiple sensory channels facilitates deeper understanding and more effective retention. The integration of intuitive and visual abilities enables individuals to transform large volumes of data into meaningful knowledge.

Kantrowitz (2012), through her work on drawing and cognition, concluded that engaging the mind, eye, and hand through drawing promotes creativity, constructive perception, and problem-solving across disciplines. Likewise, Don Norman emphasises that the unaided human mind has significant limitations and that external aids such as sketches and diagrams greatly enhance cognitive activities (Ware, 2008). Studies by Verstijnen and Van Leeuwen (1998) further revealed that sketches not only reduce cognitive load but also stimulate innovation, conceptual restructuring, and creative analogies. Visual thinking, therefore, takes advantage of external representations such as rough sketches and informal diagrams to capture and communicate concepts. These visual tools facilitate spontaneous critical thinking, collaborative problem-solving, and creative "meta-seeing" (Ware, 2008). In addition, more formal approaches to graphic communication, as proposed by McKim, allow individuals to convey messages that engage both the creator's and the viewer's "whole mind."

2.1.4. Response to an Image and Socio-Cognitive Development

A strong foundation for literacy development is built through approaches that enable individuals to acquire the skills necessary for reading, engage in meaningful learning experiences, and develop effective reading habits. Before formal reading acquisition, learners must first develop the ability to interpret and use visual information to express thoughts, feelings, and ideas. Written text is a form of language representation that conveys meaning through established conventions such as left-to-right orientation and top-to-bottom directionality. To become proficient readers, learners must be able to attend to detail, recognise, interpret, and understand symbols. They must also be motivated to engage in learning activities and acquire new literacy-related skills. Visual literacy is a key preparatory activity for pre-readers, allowing them to actively practice these foundational skills. Engaging with images supports language development, enhances attention to detail, and strengthens the ability to interpret symbols. In addition, picture books expose learners to print conventions and help them become familiar with the structure of written language. Through such experiences, learners gradually develop the habits of effective readers.

Gear (2006) identifies five essential reading strategies used by proficient readers: making connections, questioning, visualising, inferring, and transforming. These metacognitive strategies help readers construct meaning from texts. However, pre-readers can begin developing these competencies through visual literacy activities. Making connections occurs when learners relate visual content to their personal experiences. Pre-readers can practice this by discussing images that remind them of events, people, or situations in their own lives. This process supports comprehension and meaning-making. Questioning involves curiosity and inquiry. Gear (2006) distinguishes between surface-level and deeper analytical questions. Pre-readers can be encouraged to ask both simple questions ("How was this drawn?") and more complex ones ("What does this colour represent?"), thereby fostering critical thinking.

Visualisation requires learners to form mental images based on visual or textual input. While illustrations provide initial visual stimuli, learners can extend these images using imagination. Educators can support this process through prompts such as "What might be behind the door?" or "What does it feel like inside this scene?" Goldstone (1989) emphasises that mental imagery is essential for literacy development, as comprehension is limited without it. Picture book illustrations also support metaphorical thinking by providing concrete representations of abstract ideas. Inferring involves reading between the lines and identifying meaning not explicitly stated in text or images. In visual literacy, learners interpret missing information by analysing clues in illustrations such as colour, symbols, and context. Transforming refers to how reading or viewing content can influence perception and worldview. Although some complex or sensitive themes may not be suitable for very young learners, carefully selected picture books can still promote transformative thinking. For example, *Imagine a Day* (Thomson, 2005) encourages learners to reinterpret reality through imaginative visual storytelling. Elkins (2008) argues that visual literacy is not an isolated cognitive act but a socially constructed practice. Meaning is developed through interaction with visual texts and through engagement with broader cultural

and interpretive frameworks. Without understanding how visual representations are produced and consumed, one cannot fully understand contemporary literacy practices.

The concept of multi-image presentation is closely related to cue summation theory, which suggests that learning improves when multiple cues are presented either within a single sensory channel or across multiple channels. Multi-image formats, popular in the 1960s and 1970s, involved the simultaneous presentation of multiple visuals, sometimes synchronised with audio. Millard (1964) argued that simultaneous images are particularly useful for comparative learning, conceptual development, and the presentation of spatial relationships. Perrin (1969) further suggested that multi-image systems enhance information processing by increasing information density and facilitating faster learning.

However, research findings are mixed. Hartman (1961) and Hsia (1971) questioned whether simultaneous presentation consistently improves learning outcomes. Burke and Leps (1989) also noted the lack of strong empirical evidence supporting multi-image effectiveness, highlighting methodological limitations in many studies. Gagné (1965) identified association as a fundamental learning mechanism. Perrin (1969) argued that simultaneous image presentation increases opportunities for association by allowing learners to compare multiple visual stimuli at once. Low (1968) similarly observed that sequential presentations limit relational understanding compared to simultaneous displays.

Nevertheless, excessive visual stimulation may also create cognitive overload. Perrin (1969) cautioned that irrelevant details can interfere with learning if visual materials are not carefully designed. Therefore, clarity, relevance, realism, and simplicity remain essential principles in instructional design (Spaulding, 1956; May & Lumsdaine, 1958). Empirical studies further suggest that simultaneous image presentation can improve memory recall and learning performance (Berger, 1973; Low, 1968). However, these benefits depend on the learner's ability to organise and interpret visual relationships effectively.

2.1.5. Value Added to an Image and Socio-Cognitive Development

Richards and Ogden made significant contributions to aesthetics through their analysis of beauty and the psychology of literary value judgments (Munro, 1964). Aesthetics, according to *The Random House Webster's College Dictionary*, is a branch of philosophy concerned with taste and the study of beauty in nature and art. Similarly, *the Compact Edition of the Oxford English Dictionary* defines aesthetics as the philosophy or theory of taste, or of the perception of beauty in nature and art. In education, aesthetic theory is primarily concerned with the development of imagination. Broudy suggests that the cultivation of the intellect, the capacity to generate, analyse, and synthesise concepts, necessarily requires the development of imagination (Pinar et al., 2004). A multidimensional approach, involving diverse experiences, is necessary for a child to develop the ability to use imagination in learning situations. Such varied experiences enable learners to respond to questions that emerge throughout their educational journey.

Understanding involves grasping patterns in experience and formulating hypotheses to answer questions such as "What might this be?" or "Why might this have happened?" (Meynell, 1993). Consequently, the integration of aesthetics into the curriculum enables students to identify and construct meaningful compositions from the visual complexity of everyday life (Vallance, 2004). This ability enhances learners' capacity to make informed judgments and decisions in real-life situations. Broudy further argues that arts education enables students to become critically discriminating in their interpretation of images and more sensitive to emotional authenticity or manipulation (Pinar et al., 2004). Some late twentieth-century aesthetic theorists, including Moore (2004), emphasise that perception is primary, while reflection on perception is secondary. Thus, teaching learners how to see critically is as important as teaching them how to interpret what they see.

Moore's discussion of Paul Duncan highlights that everyday aesthetic experiences produced by contemporary visual culture are unavoidable. Therefore, learners must be made aware of the visual environment that surrounds them. The goal is not only appreciation but also the development of critical awareness necessary for active citizenship. Van Camp (2004) explains that aesthetic judgment involves critical thinking skills applied to art and other aesthetic objects in order to interpret meaning. Aesthetic theory, therefore, supports students' capacity for inquiry and knowledge construction. A curriculum rich in the arts develops aesthetic literacy and offers a theory of knowing that differs from mainstream educational psychology (Pinar et al., 2004).

Eaker (1938) emphasised that art and poetry are key instruments for shaping responses to life situations. Artistic experiences accumulate over time, influencing attitudes, interests, and deeper meanings of life. Through continuous engagement with the arts, individuals experience intellectual and emotional growth. Colour also has significant effects on emotions, behaviour, and physiological responses (Clark, 2000). Through colour expression, children can communicate emotions that may be difficult to express verbally (Withrow, 2004). Mahnke (1993) notes that excessive use of a single colour may produce heightened emotional reactions, while engagement with a variety of colours supports emotional balance. Studies show that depressed children tend to use fewer colours (Wadeson, 1971), while children who have experienced trauma may use darker colours such as red and black (Cotton, 2000).

Personality differences are also reflected in colour preference, with extroverted children often preferring warm colours and introverted children preferring cooler tones (Mahnke, 1993).

Hope (2008) defines drawing as meaningful mark-making that serves different purposes for individuals. Drawing can be understood both as a product and a process: the final image and the ongoing act of creation. Children use drawing purposefully to communicate ideas about the world. Research shows that drawing helps children develop, create, communicate, and record their thoughts (Anning & Ring, 2004; Hope, 2008; Matthews, 1999). Drawing also supports social development. Interaction during drawing activities promotes cooperation and communication among children (Lowenfeld & Brittain, 1987). When children share and discuss their drawings with peers and adults, their social competence improves. Vygotsky (1978) emphasises that learning occurs through social interaction, and adults play a critical role in guiding children's understanding of artistic expression. According to NCCA (2009), meaningful interactions significantly influence children's learning and development.

Furthermore, drawing is closely linked to cognitive development. Brooks (2003) explains that dialogue during drawing enhances children's mental processes and meaning-making abilities. Piaget (1956) also supports the view that children's drawings reflect their cognitive development. Drawing serves as a tool for thinking, remembering, and communicating ideas, and discussions about drawings help children retrieve and organise memories (Brooks, 2003). Lowenfeld (1965) adds that artistic activities balance intellectual and emotional development. Drawing also contributes to language and symbolic development. Children begin to develop symbolic thinking by using objects to represent ideas (Kress, 1997). This symbolic understanding supports later literacy and numeracy development (Matthews, 2003). Drawing enables children to express ideas and emotions even when verbal language is limited (Roche, 1996).

In addition, drawing provides emotional expression and satisfaction. Cox (1992) notes that pictorial arts facilitate creativity and self-expression. Bartel (2010) emphasises that artistic activities such as drawing, clay modelling, and collage enhance emotional well-being and confidence. Drawing also strengthens cognitive processes, encourages discovery, and improves communication. Hope (2008) further describes drawing as a powerful tool for generating, developing, and communicating ideas. Drawing acts as a bridge between imagination and communication, linking inner thought with external expression. It supports cognitive, affective, and linguistic development (Hawkins, 2002), making it a vital component of early childhood development.

3.2 THEORETICAL FRAMEWORK

3.2.1. Socio-Cultural Theory

Lev Vygotsky's socio-cultural theory (1934, 1978) has become a major foundation in understanding cognitive development, emphasising that learning is fundamentally shaped by social interaction and cultural context. Vygotsky argues that cognition develops first through social processes and is later internalised by the individual, meaning that social learning precedes development. Central to this perspective is the belief that the community plays a crucial role in "making meaning," as children construct knowledge through interaction with more knowledgeable others within the Zone of Proximal Development (ZPD). According to Vygotsky, cognitive development is not universal but varies across cultures because it is deeply influenced by social and cultural environments. Language is a key mechanism in this process, as thought and language begin as separate systems but gradually merge around early childhood to form inner speech, which regulates thinking. He further distinguishes between elementary mental functions such as perception, memory, and attention, and higher mental functions, which develop through culturally mediated experiences and social interaction. Cultural tools of intellectual adaptation, including memory strategies and symbolic systems, enhance cognitive processes and differ across societies. Vygotsky also highlights the importance of guided learning, where teachers, parents, or peers support the child through modelling and dialogue, enabling the gradual internalisation of knowledge. This cooperative learning process allows children to regulate their own thinking and behaviour. Scholars such as Rogoff (1990) reinforce this view by showing that children become cultural learners through guided participation in everyday practices. Similarly, Brelster and Thompson (2002) emphasise that children's artistic and aesthetic development is shaped by socially mediated experiences and educational opportunities within their environment. Vygotsky (1999) further notes that children appropriate cultural signs, such as drawing and other symbolic representations, to improve communication and cognitive development. From this perspective, children's communicative skills and socio-cognitive growth are best understood through the interaction of cultural tools, social relationships, and guided learning experiences.

3.2.2. Social Learning Theory

Social Learning Theory, developed by Albert Bandura (1977), explains that behaviour is learned from the environment through observational learning. Bandura argues that individuals are active information processors who consider the relationship between their behaviour and its consequences. He emphasised that learning would be difficult and risky if people relied only on direct experience; instead, most human behaviour is acquired by observing others and forming mental representations that guide future actions. Observational learning, therefore, depends on cognitive processes, as individuals must pay attention, interpret, and store observed behaviours before reproducing them. Bandura (1986) further introduced the concept of reciprocal determinism,

which explains human functioning as the interaction between behaviour, cognition, and the environment. According to this view, personal factors influence behaviour, behaviour influences the environment, and the environment in turn influences thoughts and actions in a continuous cycle.

Observational learning occurs when individuals learn by watching models such as parents, teachers, peers, or authority figures. These models provide behavioural examples that learners encode and later imitate, even without direct reinforcement. Bandura (1961) demonstrated that children continuously acquire both desirable and undesirable behaviours through observation. Cultural contexts also shape learning, as children exposed to community activities often learn skills by participating in or observing daily practices. For learning to occur effectively, Bandura identified four key processes: attention, retention, reproduction, and motivation. Attention refers to focusing on the model's behaviour, retention involves storing the observed behaviour in memory, reproduction requires the ability to perform the behaviour, and motivation determines whether the behaviour will be enacted. Social Learning Theory has been widely applied to the study of aggression, psychological disorders, and behaviour modification, and it forms the basis of behaviour modelling in training programmes (Bandura, 1973; 1969). More recently, Bandura expanded his work on self-efficacy, highlighting its role in learning and behaviour change (Bandura, 1993). In educational and developmental contexts, especially for children with learning difficulties or autism, social learning strategies can enhance interaction, communication, and self-confidence by encouraging learning through observation and guided participation.

3.2.3. Dual-Coding Theory (DCT)

Dual-Coding Theory (DCT), developed by Paivio (2006), explains cognition as the interaction of two distinct but interconnected systems: the verbal system, responsible for language processing, and the nonverbal (imagery) system, which processes visual and other sensory information. Both systems are activated in learning, although one may dominate depending on the task, with language typically guiding logical and sequential processing in the left hemisphere and imagery supporting holistic and intuitive processing in the right hemisphere. These hemispheres are interconnected through the corpus callosum, enabling integrated cognitive functioning. Although individuals often show a preference for one mode, this dominance is flexible rather than fixed, and both systems can be developed to enhance learning effectiveness (Monroe Institute, 2014). Cognitive development in DCT is viewed as a "bootstrapping" process where each system strengthens the other through continuous interaction and increasing complexity. This idea aligns with Piaget's concepts of assimilation and accommodation in schema development. The theory emphasises that early development of the nonverbal system provides a foundation for later cognitive and language skills. In reading, learners understand concrete words more easily when paired with images than with sounds alone. Similarly, encouraging mental imagery during reading improves comprehension and vocabulary acquisition. Overall, combining verbal information, visual imagery, and elaboration enhances learning outcomes across educational levels (Paivio, 2006).

3.2.4. Multimedia Theory

Richard Mayer, a leading scholar in multimedia learning, built his theory on Paivio's Dual Coding Theory, Sweller's Cognitive Load Theory, and Bruner's constructivist perspective. Mayer and Moreno (2000) propose that meaningful learning occurs when learners actively engage in three cognitive processes: selection, organisation, and integration. Selection involves identifying relevant words for verbal processing and relevant images for visual processing, while working within the limits of human memory capacity. According to Miller (1956), working memory holds about seven units of information for a short duration, which is why information is better remembered when "chunked," such as grouping digits into smaller units. Organisation refers to structuring selected information into coherent mental models, which may be sequential, hierarchical, or based on prior knowledge and experience. Rehearsal and meaningful processing in working memory enhance retention and understanding. Integration occurs when learners connect verbal and visual representations, making learning more meaningful and reinforcing dual-channel processing. Mayer emphasises that learning is improved when words and images are presented together in a complementary way. Lohr (2003) extends these ideas into design principles based on perception. Figure–ground perception highlights the need to emphasise essential information while reducing distractions using contrast, size, and spacing. Hierarchical perception guides learners through structured pathways using arrows, headings, and visual cues to avoid cognitive disorientation. Gestalt principles explain how learners perceive wholes rather than isolated parts, supporting simplified yet meaningful instructional design. Laws such as closure, proximity, similarity, contiguity, and prior experience help designers create clear, organised, and cognitively efficient instructional materials.

4. METHODOLOGY

Nworgu (1991) asserts that a research design is a plan that specifies how data relating to a particular problem will be collected and analysed. It provides a procedural outline for the conduct of an investigation. The research design used in this study was a quantitative research design. More specifically, a quasi-experimental design was employed to collect quantitative data using tests as the main instrument. A quasi-experimental non-equivalent group design involves assigning subjects to two different groups in order to determine whether the groups differ initially on the outcome measure. Both groups are pre-tested on the outcome measure. The treatment is then administered only to the experimental group, while the control group

does not receive the treatment. At the end of the intervention, a post-test is administered to both groups.

4.1. Study Area

The study was carried out in the Mfoundi Division, with headquarters in Yaoundé, Cameroon, specifically in Yaoundé VI. The selected institution was Mario Academic Complex, located in Simbock-Mendong, near the Jouvence neighbourhood opposite Boulangerie La Rive. The school was created in 2003 by Mrs Awanga Margret and is headed by Headmistress Mrs Lawong Collette. It is an Anglo-Saxon institution offering education from pre-nursery to Class Six, with modern infrastructure, including multiple classroom blocks and a playground. The school has a diverse population of approximately 697 pupils and 27 teachers, including both Anglophone and Francophone learners.

4.2. Sample

A sample, according to Amin (2005), is a small portion of a population selected for observation and analysis, from which generalisations can be made about the larger population. The study sample consisted of 78 pupils. The school was purposively selected because it has a nursery section managed by a head teacher and meets the requirements of a visual literacy curriculum with adequate visual resources, including print, media, and other instructional materials. In addition, the school environment, including its aesthetic wall drawings, reflects a visually oriented learning setting that aligns with the objectives of the study.

TABLE 1: Distribution of pupils to experimental and control groups according to classes.

Groups	N2A	N2B	Total
Experimental	39	39	78
Control	39	39	78
Total	39	39	78

The main assessment objectives were as follows: pupils can identify different objects drawn; pupils are able to identify primary colours and the first eight letters of the alphabet; pupils are able to explore materials needed for art or drawing; and pupils are able to trace and colour objects drawn.

4.3. Visual literacy assessment test

This experiment was intended to test the third research variable, that is, "how does the value added to an image influence the socio-cognitive development of pupils". According to Williams and Wood (1977), children are learning to be more independent and are having success with fine motor skills, which also gives them more expression and control in colouring, the ability to copy symbols and draw more details. To test this attribute, the researcher selected the image of a flower which she drew using broken lines, and three main objectives were expected from the pupils. First, pupils were to show mastery of exploration of the visual material they need, which conforms with the visual literacy standard one in chapter one. Pencils, erasers, and colours were within the range of pupils. They were to select what they needed. This was evaluated on two points; secondly, with the materials chosen, pupils were to appreciate the flower by tracing the broken lines to produce a beautiful flower. This was evaluated on two points equally, and thirdly, they were to choose colours of their choice to appreciate the art that has been produced by colouring. This was scored on two points. Giving a total sum of 6 points. The overall scores obtained by pupils were divided by 6 and the result multiplied by 10 to have a whole score. This exercise was repeated after two weeks with the administration of treatment to the experimental group. This was done to reduce pupils' anxiety about using colours. The range of colours at their disposal was reduced to three main colours, but they took into consideration the functions of the colours. These colours were: C- yellow, F- dark red and C-black. These letters were labelled on the broken lines of the flower, and pupils were to correspondingly colour the image with the matching letters on it. The post scores for each group were obtained, and the two scores were compared to test the outcome measured. This exercise took six hours and fifty minutes and lasted three days, that is, three hours and twenty-five minutes in each group. Approximately, the researcher spent five minutes with a child.

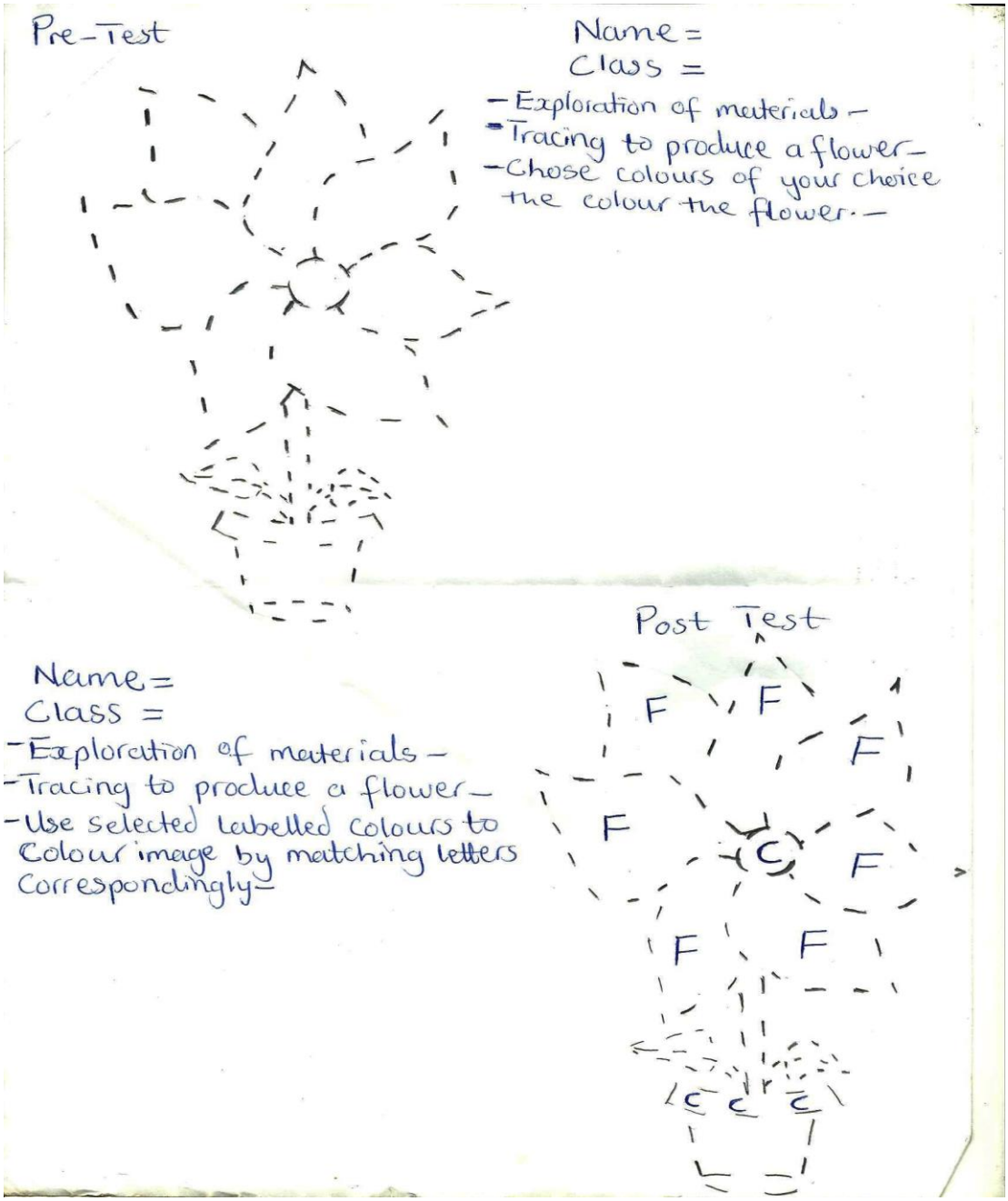

FIGURE 1: Images of the visual literacy assessment test.

4.4. Instruments for Data Collection

The researcher developed the instruments used for data collection in this study, which consisted of visual literacy assessment tests. A quasi-experimental design was used, involving the administration of three tests (Assessment Tests 1, 2, and 3) to both the experimental and control groups. Test 1 assessed pupils' reception of images, Test 2 examined their responses to coloured versus black-and-white images, and Test 3 measured the value added to an image by pupils. The instruments were administered to Nursery 2A and Nursery 2B, each with 39 pupils aged 5 to 6 years. Nursery 2A comprised 20 girls and 19 boys, while Nursery 2B included 23 girls and 16 boys.

4.5. Research Question

Does the value added to an image affect pupils' socio-cognitive development?

4.6. Research Hypothesis

There is a significant relationship between the value added to an image and pupils' socio cognitive development.

5. RESULTS

The results of the study reveal that adding value to images significantly enhances pupils' socio-cognitive development. Images help learners to better understand concepts, improve observation skills, and stimulate critical thinking during classroom activities. The findings further show that visual materials encourage interaction, creativity, and active participation among pupils. Through image interpretation and description, learners develop communication skills, confidence, and social understanding. Therefore, the integration of meaningful visual resources in teaching promotes both cognitive growth and social development among pupils.

5.1. Variability of Value added to an image's scores by gender and group

We aim to examine the variability of value added to an image in pupils' scores across groups, using gender as a covariate. We address the following question: Do value-added-to-an-image scores (pre-test and post-test) differ across groups and gender? Since this involves comparing multiple means, a mixed analysis of variance (mixed ANOVA) will be used to assess the variability of pupils' image-related scores across gender and group.

TABLE 2: Variability of value added to an image scores by gender and group.

	Group	Mean	Std. Deviation	N
Pre-test	Control Group	6,9417	1,22786	36
	Experim Group	6,4128	1,39834	39
	Total	6,6667	1,33713	75
Post-test	Control Group	8,4333	,92736	36
	Experim Group	9,5436	,70777	39
	Total	9,0107	,98784	75

The results reveal a non-significant difference in pre-test scores between the control and experimental groups in our study. It can therefore be concluded that pupils in the two groups were at a relatively similar level at the beginning of the intervention, with respect to gender. The post-test scores also show a non-significant difference, with gender acting as a covariate. In the control group (M = 8.4333, SD = 0.9273) and the experimental group (M = 9.5436, SD = 0.7077), pupils were generally at a comparable level in terms of their scores, with respect to gender.

The results of the multivariate test (Wilks' Lambda) revealed a statistically significant difference in value-added-to-an-image scores (pre-test and post-test) based on pupils' group membership, $F(1, 71) = 10.993$, $p < 0.001$; Wilks' $\Lambda = 0.797$. However, value-added-to-an-image scores did not significantly vary across gender ($p > 0.05$), and there was no significant interaction effect between value-added-to-an-image, group, and gender ($p > 0.05$). It can therefore be concluded that the improvement in post-test scores is dependent on the experimental factor.

TABLE 3: Tests of Within-Subjects Effects value added to an image by gender and group.

Source		Type III Sum of Squares	Mean Square	F	Partial Eta Squared
ValueAdded	Sphericity Assumed	15,879	15,879	18,088***	,203
	Greenhouse-Geisser	15,879	15,879	18,088***	,203
	Huynh-Feldt	15,879	15,879	18,088***	,203
	Lower-bound	15,879	15,879	18,088***	,203
ValueAdded * group	Sphericity Assumed	9,651	9,651	10,993***	,134
	Greenhouse-Geisser	9,651	9,651	10,993***	,134
	Huynh-Feldt	9,651	9,651	10,993***	,134
	Lower-bound	9,651	9,651	10,993***	,134
ValueAdded * gen	Sphericity Assumed	,143	,143	,163	,002
	Greenhouse-Geisser	,143	,143	,163	,002
	Huynh-Feldt	,143	,143	,163	,002
	Lower-bound	,143	,143	,163	,002
ValueAdded * group * gen	Sphericity Assumed	2,671	2,671	3,043	,041
	Greenhouse-Geisser	2,671	2,671	3,043	,041
	Huynh-Feldt	2,671	2,671	3,043	,041
	Lower-bound	2,671	2,671	3,043	,041
Error(ValueAdded)	Sphericity Assumed	62,332	,878		
	Greenhouse-Geisser	62,332	,878		
	Huynh-Feldt	62,332	,878		
	Lower-bound	62,332	,878		

N =75 ; df = (1, 71) ; *** (p < 0,001)

It can be observed that while the experimental group improved their scores in value added to an image, the scores of the control group decreased. Non-significant interactions were observed for value added and group, $F(1, 71) = 18.088$, $p > 0.05$; value added and gender, $F(1, 73) = 0.163$, $p > 0.05$; and value added, group, and gender, $F(1, 73) = 3.043$, $p > 0.05$. These results indicate that gender does not covary with group to influence scores in value added to an image. It appears from the above findings that the experimental factor (image reception) achieved the desired effect, as pupils' scores improved significantly after the intervention; however, gender does not act as a covariate influencing the scores.

TABLE 4: Variability of Value added to an image's scores by group and age.

	Group	Mean	Std. Deviation	N
Pre-test	Control Group	6,9417	1,22786	36
	Experim Group	6,4128	1,39834	39
	Total	6,6667	1,33713	75
Post-test	Control Group	8,4333	,92736	36
	Experim Group	9,5436	,70777	39
	Total	9,0107	,98784	75

We examine the variability of value-added-to-an-image scores among pupils across groups, using age as a covariate. The study addresses the question: Do value-added-to-an-image scores (pre-test and post-test) differ across groups and age? Since this involves comparing multiple means, a mixed analysis of variance was used to assess the variability of pupils' scores across groups and age, as shown in Table 4.17. The results below illustrate differences in mean scores for both the pre-test and post-test across groups with respect to pupils' age. In the pre-test, there was no significant difference between the control group ($M = 6.9417$, $SD = 1.2278$) and the experimental group ($M = 6.4128$, $SD = 1.3983$), $t(71) = 12.313$, $p < 0.001$. However, the interpretation should be cautious, as this result suggests a statistical difference rather than equivalence at baseline. Overall, pupils in both groups were not entirely at the same level at the beginning of the intervention, even when considering age as a covariate. For the post-test, the results show a higher mean score in the experimental group ($M = 9.5436$, $SD = 0.7077$) compared to the control group ($M = 8.4333$, $SD = 0.9273$), indicating an improvement in the experimental condition. The multivariate test (Wilks' Lambda) revealed a statistically significant effect of age on pupils' responses to image-based tasks, $F(1, 71) = 12.313$, $p < 0.001$, Wilks' $\Lambda = 0.852$. However, the interaction between group and age was not statistically significant ($p > 0.05$). Overall, the findings suggest that post-test score improvements are significantly influenced by the experimental factor ($p < 0.001$), confirming the effectiveness of the intervention.

TABLE 5: Tests of Within-Subjects Effects Value added to an image by group and age.

Source		Type III Sum of Squares	Mean Square	F	Partial Eta Squared
ValueAdded	Sphericity Assumed	10,216	10,216	12,313***	,148
	Greenhouse-Geisser	10,216	10,216	12,313***	,148
	Huynh-Feldt	10,216	10,216	12,313***	,148
	Lower-bound	10,216	10,216	12,313***	,148
ValueAdded * group	Sphericity Assumed	,364	,364	,439	,006
	Greenhouse-Geisser	,364	,364	,439	,006
	Huynh-Feldt	,364	,364	,439	,006
	Lower-bound	,364	,364	,439	,006
ValueAdded * age	Sphericity Assumed	1,006	1,006	1,213	,017
	Greenhouse-Geisser	1,006	1,006	1,213	,017
	Huynh-Feldt	1,006	1,006	1,213	,017
	Lower-bound	1,006	1,006	1,213	,017
ValueAdded * group * age	Sphericity Assumed	4,657	4,657	5,614*	,073
	Greenhouse-Geisser	4,657	4,657	5,614*	,073
	Huynh-Feldt	4,657	4,657	5,614*	,073
	Lower-bound	4,657	4,657	5,614*	,073
Error(ValueAdded)	Sphericity Assumed	58,907	,830		
	Greenhouse-Geisser	58,907	,830		
	Huynh-Feldt	58,907	,830		
	Lower-bound	58,907	,830		

N =75 ; df = (1, 71) ; *** (p < 0,001)

It can be observed that while the experimental group improved their scores in value added to an image, the scores of the control group decreased. Non-significant interactions were observed between value added and group, $F(1, 71) = 0.439$, $p > 0.05$, and between value added and age, $F(1, 71) = 1.213$, $p > 0.05$. However, a significant interaction was found among value added, group, and age, $F(1, 71) = 5.614$, $p < 0.05$. These results suggest that age covaries with group in influencing value added to image scores. Overall, the findings indicate that the experimental factor (value added to an image) achieved its intended effect, as pupils' scores improved significantly following the intervention; however, age does not appear to function as a covariate influencing the scores.

5.2 Value added to an image and socio-cognitive development

Value added to an image refers to the ability to critically observe and analyse objects, especially those of artistic value, to interpret them into personal meaning (Camp, 2004). This explains the hypothesis that value added to an image significantly influences pupils' socio-cognitive development.

TABLE 6: Descriptive Statistics for pretest/posttest for value added in two groups.

	Group	Mean	Std. Deviation	N
Pre-test	Control Group	6,9417	1,22786	36
	Experim Group	6,4128	1,39834	39
	Total	6,6667	1,33713	75
Post-test	Control Group	8,4333	,92736	36
	Experim Group	9,5436	,70777	39
	Total	9,0107	,98784	75

We observed that the control group consisted of 36 pupils, while the experimental group consisted of 39 pupils. The mean values for the pre-test and post-test measurements of the control group on value-added to an image scores were M = 6.9417; SD = 1.2278 and M = 8.4333; SD = 0.9273, respectively. Similarly, the mean values for the pre-test and post-test measurements of the experimental group on value-added to an image scores were M = 6.4128; SD = 1.3983 and M = 9.5436; SD = 0.7077, respectively.

TABLE 7: Tests of Within-Subjects Effects of value added in two groups.

Source		Type III Sum of Squares	Mean Square	F	Partial Eta Squared
ValueAdded	Sphericity Assumed	199,994	199,994	224,280	,754
	Greenhouse-Geisser	199,994	199,994	224,280	,754
	Huynh-Feldt	199,994	199,994	224,280	,754
	Lower-bound	199,994	199,994	224,280	,754
ValueAdded * group	Sphericity Assumed	25,147	25,147	28,201	,279
	Greenhouse-Geisser	25,147	25,147	28,201	,279
	Huynh-Feldt	25,147	25,147	28,201	,279
	Lower-bound	25,147	25,147	28,201	,279
Error(ValueAdded)	Sphericity Assumed	65,095	,892		
	Greenhouse-Geisser	65,095	,892		
	Huynh-Feldt	65,095	,892		
	Lower-bound	65,095	,892		

N =75 ; df = (1, 73) ; *** (p < 0,001)

It can be observed that while the experimental group improved their scores in value added to an image, the scores of the control group decreased. Significant differences were observed between the pre-test and post-test scores for value added to an image, $F(1, 73) = 224.280$, $p < 0.001$, partial $\eta^2 = 0.754$, as well as for the interaction between value added and group, $F(1, 73) = 28.201$, $p < 0.001$, partial $\eta^2 = 0.279$. These results reveal a highly significant effect of the experimental factor.

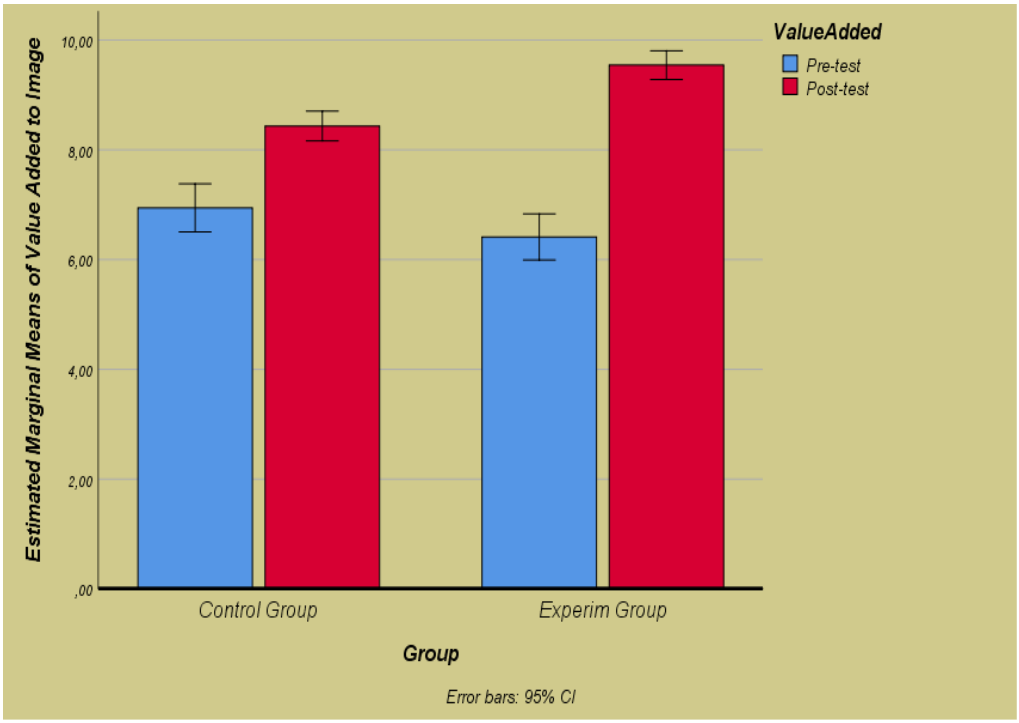

FIGURE 2: Diagram showing the bar chart of pretest-posttest for value added in the two groups.

The analysis of variance revealed a significant difference in value added to an image between pupils in the comparison group and those in the experimental group ($p < 0.001$). This means that pupils' ability to add value to an image differed significantly across the two groups. We can therefore conclude that value added to an image significantly influences pupils' socio-cognitive development as a result of the introduction of the experimental factor.

6. DISCUSSION

There is no significant relationship between the value added to an image and pupils' socio-cognitive development. The findings revealed that there was a progression in the experimental group that was significantly higher than that observed in the control group. The null hypothesis was therefore rejected, implying that value added to an image significantly improves pupils' socio-cognitive development. At their level, pupils cannot draw a flower, but they were able to add value to a pre-drawn image. They traced dotted lines to produce a beautiful flower, which boosted their confidence and self-esteem as they drew and coloured the image. The theory of aesthetics in education is primarily concerned with the development of imagination. Broudy, as cited in Pinar et al. (2004), supports this finding by explaining that the cultivation of intellect, the capacity to generate, analyse, and synthesise concepts, necessarily requires the development of imagination. A multidimensional variety of methods that contribute to the development of experience is necessary for a child to mature in their ability to use imagination in learning situations. Varied and diverse experiences offer learners the ability to respond to questions that arise throughout their educational life. Understanding involves grasping patterns in experience and formulating hypotheses in response to questions such as "What may this be?" or "Why may that have happened?" that emerge from experience (Meynell, 1993). As a result of incorporating aesthetics into the curriculum, students develop the ability to identify and construct aesthetically meaningful compositions from the visual complexity and clutter of daily life (Vallance, 2004). The development of this skill enables learners to improve their ability to make informed judgments and decisions about the challenges they encounter in life and in the world.

Choosing the correct colour to enhance the flower did not mislead some pupils; however, a good number were able to identify the functions of colours thanks to the effect of the experimental intervention. Adrienne Gear's fourth strategy of reading images (inferring) supports this result by encouraging readers to look for clues and fill in missing information not explicitly provided in the picture. Readers must discover and interpret meaning through visual cues. This strategy can also be applied in visual literacy exercises, where pre-readers infer meaning from images in the absence of written text. In addition, learners often need to interpret the meaning of colours and symbols in order to understand characters in picture book illustrations. An earlier study by Myatt and Carter (as cited in Heinich et al., 1999) suggests that most learners prefer colour visuals to black-and-white visuals, although no significant difference in learning outcomes is observed unless colour is directly relevant to the content being learned.

7. EDUCATIONAL IMPLICATIONS OF THE STUDY

Educationally, the study contributes additional knowledge to the existing body of literature on visual literacy education. In Cameroon, however, visual literacy education remains a major challenge, as many learners in both public and private schools are taught with little or no use of visual materials.

This often results in pupils having diverse prior knowledge during learning processes, while teachers frequently rely on the excuse that preparing visual materials is too laborious. Consequently, this situation has significantly hindered many pupils from developing creativity and a strong sense of initiative. The study demonstrates that although learners may exhibit both verbal and visual learning preferences, a solid foundation in visual literacy education constitutes a strong basis for academic success. It further reveals that visual literacy classrooms can enhance learners' interaction skills depending on the teaching strategies employed by the teacher, despite the challenges posed by inadequate instructional resources.

In addition, the study highlights the importance of bridging the gap between "digital immigrants" and "digital natives" by equipping teachers with 21st-century teaching skills. By integrating digital tools and learner-centred visual approaches, educators not only adopt the practices of digital natives but also avoid becoming professionally outdated in a rapidly evolving digital society. At the early stages of learning, children are highly expressive and benefit greatly from opportunities to describe and interpret visual stimuli. This process helps them build descriptive vocabulary and conceptual understanding, even if it may sometimes appear repetitive or unstructured. Therefore, educators should view early drawing and expressive attempts as an essential part of learning development. Children should be encouraged rather than discouraged when they engage in exploratory activities such as drawing, even if it results in disorder or repeated attempts, as these activities are fundamental to creativity, cognitive development, and meaning-making.

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