
Examining the Development of Basic Drawing Techniques for Teaching and Learning of Science and English Language in Sekondi-Takoradi Metropolis, Western Region and Sagnarigu Municipal, Northern Region of Ghana

Frank Opoku^[1], Macharious Nabang^[2]^[1]Department of Creative Arts, Holy Child College of Education, Takoradi, Ghana^[2]Department of Creative Arts, Bagabaga College of Education, Tamale, Ghana

Abstract. This study examines the integration of basic drawing techniques into the teaching and learning of Science and English Language in selected primary schools within the Sekondi-Takoradi Metropolis, Western Region and Sagnarigu Municipal, Northern Region of Ghana. The research explores how fundamental drawing skills can enhance comprehension, critical thinking, and engagement among primary school pupils. By focusing on the role of visual representation in pedagogy, the study investigates the extent to which drawing can aid conceptual understanding in science and improve creative expression and descriptive writing in the English Language. Data were collected through classroom observations, teacher interviews, and student assessments to evaluate the effectiveness of incorporating drawing into instructional strategies. The purposive sampling of thirty (30) teachers in thirty (30) primary schools in these Municipalities was considered an equal distribution of fifteen (15) each. The findings revealed that drawing serves as a powerful tool to bridge abstract concepts in science and language skills in English, fostering a holistic learning experience. The study recommends capacity-building initiatives for teachers to adopt visual learning techniques and the inclusion of drawing as a standard component of the curriculum to support active and experiential learning. The Dual Coding Theory by Allan Paivio (1971) underpins this study. Dual Coding Theory posits that information is processed in two distinct but interconnected systems: verbal (language) and non-verbal (visual imagery). Incorporating basic drawing techniques into teaching leverages these dual systems, enhancing comprehension and retention of concepts in Science and English Language.

Keywords: creativity, development, drawing, drawing guide, drawing skills, drawing techniques, teaching and learning resources

Public Interest Statement

The integration of basic drawing techniques in teaching and learning serves as a creative and practical approach to enhancing education. This study focuses on the Sekondi-Takoradi Metropolis, Western Region and Sagnarigu Municipal, Northern Region of Ghana, and explores how drawing can help primary school pupils better understand complex concepts in Science and English Language. Drawing simplifies abstract ideas, fosters creativity, and promotes active learning, making it especially valuable in areas with limited educational resources. To a large extent, teachers had a low degree of knowledge and skills to ensure effective and efficient drawing techniques in Ghanaian Classrooms. Examining this approach, the study seeks to contribute to the improvement of educational outcomes, aligning with Ghana's goals of quality education and literacy development. The findings will be relevant to educators, policymakers, and curriculum developers aiming to create engaging and inclusive learning experiences for children.

Introduction

Teaching in the lower primary class can be challenging since a teacher aims at meeting learners' academic needs including physical activities that go along with teaching and learning in the classroom. Because the children's mental faculties have not yet grown, a variety of

drawings are used to illustrate various topics to the pupils in the lower elementary English and Science Textbooks.

Children learn from what they know to what they don't know, which is why there is a need to use drawings and sketches. Drawing, according to Brooks (2003), can be used to explain a topic and thereby increase children's knowledge because it serves as a tool for remembering. Discussing a drawing helps children retrieve memories from the drawing.

Drawing is a form of visual art in which a person marks paper or another two-dimensional medium such as cardboard, plastic, leather, canvas or board with various implements. It is also known as 'mark-making', 'works on paper', or 'marks that represent visual thoughts. As explained by Hutter (2017), drawing is the art of making images on a surface, usually, paper, with marks made with ink, graphite, chalk, charcoal or crayon.

In the classroom, drawing can be done on a chalkboard or whiteboard or cardboard. Drawing and pictures, according to Duchastel (1978), can engage attention, increase recall, improve understanding, and provide context. The advantages of incorporating drawing into children's learning are numerous. Brooks (2003) also explains how sketching helps youngsters form meaning and express their thoughts with others using Vygotskian theory. Drawings, she claims, can assist bridge the gap between observational thinking and more abstract, scientific thinking. It is both a means of communication and a problem-solving technique and also serves as a tool for remembering and talking about a drawing helping children retrieve memories from the drawing.

Despite the benefits of drawing, teachers are not able to utilize its potential and this is what this study seeks to further explore. It was observed that most of the drawings pasted on walls as Teaching and Learning Resources (TLRs) were not related objects that were drawn to represent. For instance, animals drawn looked like other animals with most of the images suspended in space.

It was also observed that teachers were unable to do simple drawings to explain their points, making children form their concepts affecting teaching and learning and frustrating the academic progress of children in the long run. According to Nketsiah (2003), because the teacher is unable to create illustrations on his or her own during the teaching process, the delivery is primarily verbal; as a result, children form different concepts of what is being taught because there are no pictures to which they can relate the lesson for a better understanding. Later investigations revealed ridiculous drawings in lesson notes and TLRs.

Teachers resorted to youngsters for drawing assistance, according to the initial studies conducted. Teachers will sometimes confer with other persons who have some drawing experience or artists to create a Teaching and Learning Resource for them (Nketsia, 2003). All of these were due to a lack of sketching skills on the part of the teachers. Nketsia goes on to say that most nursery school teachers aren't artists and haven't received any training in sketching skills. A teacher at the lower primary school (Primary One) should be taught some drawing techniques in order to improve upon his or her skills to draw humans, animals, and other objects in order to make his or her teaching more meaningful; otherwise, children will form their ideas about what he or she is teaching.

Hence, this study sought to investigate the drawing techniques that Primary One teacher exhibit during the teaching of Science and English Language thereby developing their drawing techniques to assist pupils in understanding concepts taught in selected primary schools within Sekondi-Takoradi metropolis, Western region of Ghana.

Review of Related Literature and Theoretical Framework

Theoretical Framework

The Dual Coding Theory by Allan Paivio (1971) underpins this study. Dual Coding Theory posits that information is processed in two distinct but interconnected systems: verbal (language) and non-verbal (visual imagery). Incorporating basic drawing techniques into teaching leverages these dual systems, enhancing comprehension and retention of concepts in Science and English Language. Drawings facilitate the visualization of abstract ideas in science and improve storytelling and vocabulary-building in language learning. This theory aligns with the cognitive development needs of primary school learners, supporting their ability to process and relate new information through both linguistic and pictorial means. Grounded in Dual Coding Theory, the study employs a combination of classroom observation, teacher interviews, and student assessments to evaluate the impact of visual aids on learning outcomes. Findings are expected to demonstrate how drawing techniques can bridge gaps in abstract concept delivery and linguistic development, offering innovative pedagogical strategies for primary education in resource-constrained contexts. This research aims to contribute to improving the quality of teaching in Ghanaian primary schools by advocating for multimodal instructional practices.

Concept of Drawing

On a two-dimensional surface, drawing is the process of making marks with tools such as pencils and pastels (Fay 2013). According to Hutter (2017), drawing is the art or process of creating images on a surface, typically paper, using marks made with ink, graphite, chalk, charcoal or crayon. It is also known as mark-making, 'works on paper', or marks that represent visual thoughts. Drawing, according to the definitions above, is a type of Visual Art in which a person expresses an idea by using various instruments such as a pencil or crayon to mark paper or another two-dimensional medium such as cardboard, plastic, leather, canvas or board. Paper is the most frequent drawing support, however, other materials such as cardboard, plastic, leather, canvas and board can also be used. Temporary drawings, on the other hand, can be done on a chalkboard, a whiteboard, or nearly anything else (Wikipedia, the free encyclopedia, 2017).

Importance of Drawing in Infant Learning

The importance of drawing in a child's education has been recognized. According to Taylor (2014), drawing is an important aspect of the curriculum at all levels and in all topics and it requires a firm commitment. As Taylor points out, it is critical that sketching become an integral element of our educational system. Anim (2012) supports this assertion and describes drawing as a basic visual language that is as vital as the development of writing and verbal skills for communication and expression.

Brooks (2003) uses Vygotskian theory in her paper to describe how sketching assists youngsters in constructing meaning and sharing their ideas with others. Drawings, she claims, can assist bridge the gap between observation-based thinking and more abstract, symbolic (i.e. scientific) thinking. Her paper provides a clear introduction to Vygotskian theory and emphasizes the relevance of sketching and visualization for learners when conducting investigations and understanding new concepts.

Drawing, according to Brooks (2003, p.319), "is both a means of communication and a problem-solving technique. Children can use sketching to not only observe what they are thinking but also to play around with and modify their thoughts". Drawings are more of a component of the learning process than a finished output. The implication is that a single drawing should not be used to determine a child's developmental level. Children can clarify

their thoughts by talking about drawings or labeling drawings to explain them to others, according to Brooks.

As a result, Brooks urges instructors to place a high emphasis on children's drawings because of the information they contain. She claims that as children's thinking develops, they should revisit, re-contextualize and revise their drawings. As students gain a more abstract, symbolic and scientific grasp of many events, she sees pictures as more than just adornment. As a result, educators will be able to customize their support and facilitation properly.

Methods of Teaching Drawing

To ensure effective teaching at all levels of education, according to Farrant (1996), instructors must embrace and lead their lessons using the teaching maxims. Drawing may be taught using a variety of ways. According to Hall (2007), different people learn in various ways. Hall explained how individuals learn using Edgar Dale's Cone of Experience. He says that students who read, hear, or develop practical skills have a better probability of remembering knowledge than those who just see and hear 50% of it. Furthermore, just 30% of those who see information keep it, but only 10% of those who read it retain it. For practical classes such as sketching, Hall suggests using the demonstrative approach. This implies that the demonstration approach is best for students who want to learn new abilities since they can see and handle the tools, materials, equipment and supports that are needed for the job, as well as witness and participate in their usage. More significantly, the demonstration approach allows students to be creative while also allowing them to go at their speed while working on their assigned projects.

Focusing on effective mind-muscle synchronization leads to the creation of quick and meaningful movement patterns. "No impression without expression speaks of the significance of skills" Kochhar (1985: p.200) adds to this point regarding skills education.

Grover (1995) also believes that the 'Dictation Drawing' approach is an excellent way to teach drawing. This is a technique in which pupils are required to listen to a verbal description of an object or scenario and then construct a picture based on that description. When pupils are asked to draw a pig wearing sunglasses, and shoes, smoking a cigarette, and reading newspapers, for example, they will translate the animal's verbal description into a creative depiction on a surface. Grover goes on to say in Dictation Drawing that when a pupil hears a spoken speech for the first time, he or she will listen carefully, which will help them develop a competitive spirit to be the best in their group, as well as generate enjoyment and incentive for them to take up drawing.

The direct demonstration technique uses a step-by-step procedure for a work assignment to help students become more imaginative, inventive, original and creative while also enhancing the teaching and learning process. It also gives students the option of repeating a technique many times. Slow and mediocre learners are helped to attain some level of success while simultaneously learning to draw (Grover, 1995).

Even though there are many teaching techniques accessible such as lectures, field trips, discussions, and projects that instructors may use, it is considered that the demonstration or hands-on approach is the most suited means of teaching drawing since it includes the act of doing.

As a result, teachers must employ content that is appropriate for the students they teach, as well as student-centered lesson presentation techniques that are consistent with the class's objectives.

Sequential Teaching and Learning of Drawing

Learning to draw relies heavily on a well-structured instructional method (Lee, 2000). Lee says that without a procedural approach, students' futures may be bleak; as a result, it's

critical to teach kids the fundamentals before gradually and intentionally building on them to gain the required abilities and knowledge to draw properly.

The researcher agrees with Lee that learning to draw effectively requires making methodical efforts to familiarize oneself with the fundamentals so that one may approach the future with optimism.

Above all, the drawing should be taught and learned via activities. As a result, drawing instruction should be tailored to the various levels of students. To enable all students to learn the specified knowledge and skills for drawing very well, teaching must follow a logical process.

Drawing Techniques in Relation to Infant Learning

To draw properly, one must first comprehend the various drawing methods and what they entail. Being mindful of the proportions of things in relation to one another, as well as the form of the ‘negative space’, or the space between objects, are important drawing skills.

The working area on the page should be utilized to the fullest extent possible. Contour lines of various widths and densities may be used to add life, depth, and interest to a drawing; different grades of pencil can be used to produce a variety of lines.

The application of shading methods like hatching and pointillism will give the shape more form and substance. The darkest tones visible should be blocked in first to give the drawing instant depth. After that, the tones should be built up, and the extreme highlights should be added to bring the picture to life (The Free Dictionary, 2007).

According to Kimon (2001), drawing methods include blind contour, gesture, grisaille, mass and scribble drawing. Both authors mention elements that play a significant role in various drawing techniques. They are, however, insufficient because students can learn a variety of simple drawing techniques. Outlines to imply light and shadow, value drawing, and then negative drawing are examples of drawing methods.

Similarly, Mitter and Howze (2007) highlighted outline drawing as a drawing method, while also mentioning light and shadow in reference to Vincent van Gogh, who saw the line as the most important aspect of drawing. Vincent was said to have used contrasting lines to balance light and dark values, resulting in cohesive and attractive drawings with a broad variety of textures, defined space, and identifiable forms.

Other components might be investigated if desired, as Coach (2008) suggested, and artists could employ what works best for them. The author advises, however, that this may differ from how other people apply the approaches, but that this should not be seen as a flaw in the selected method. Also, which method is used depends on what is being drawn and how the artist wants the image to be rendered.

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Methodology

A qualitative research design was employed for this study with an emphasis on action and descriptive research. The choice of this research design was based on the nature of the topic ‘Development of Basic Drawing Techniques for Teaching and Learning of Science and English Language at Sekondi-Takoradi Metropolis, Western Region and Sagnarigu Municipal, Northern Region of Ghana. This facilitated the investigation for the study on the quality of Drawings done by the teachers. A purposive sampling technique was adopted. The participants selected were the technical drawing teachers. Thirty (30) respondents from thirty (30) primary schools were used as a sample size in the Sekondi-Takoradi Metropolis and Sagnarigu

Municipal. The data collection instruments employed to elicit significant information for the study were observation, focus group discussion and interview. These instruments were used in line with the design of the study. In this research ethical consideration was appreciated and participation without any coercion or deception.

Results and Discussion

During observation, appropriate handling of the pencil such that drawing will be made easy was a struggle initially but they became conversant along the line. It was also realized that the drawings produced were oversized for the papers as images were either too big or too small for the space provided. Besides, some images drawn were suspended in space and appeared hanging.

Features of both humans and animals were wrongfully drawn and often oversized. Features of men, for instance, were drawn like women and females were portrayed as males because of their inability to draw the masculine and feminine features correctly. Most of the drawings were fanciful and hastily drawn appearing to be unfinished. Also, objects in a picture plane were not properly represented. The relationship between objects and their positions was difficult to establish. Some of the drawings were small considering the paper size, and others were lagging and appeared wobbly.



Figure 1: A teacher's drawing of a boy

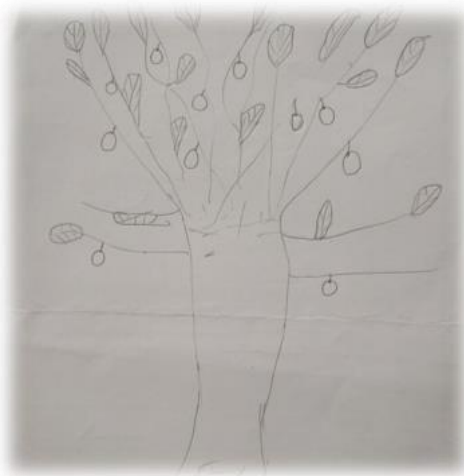


Figure 2: A teacher's drawing of a tree



Figure 3: A teacher's drawing of a house and its environment



Figure 4: Another teacher's drawing of a house and its environment



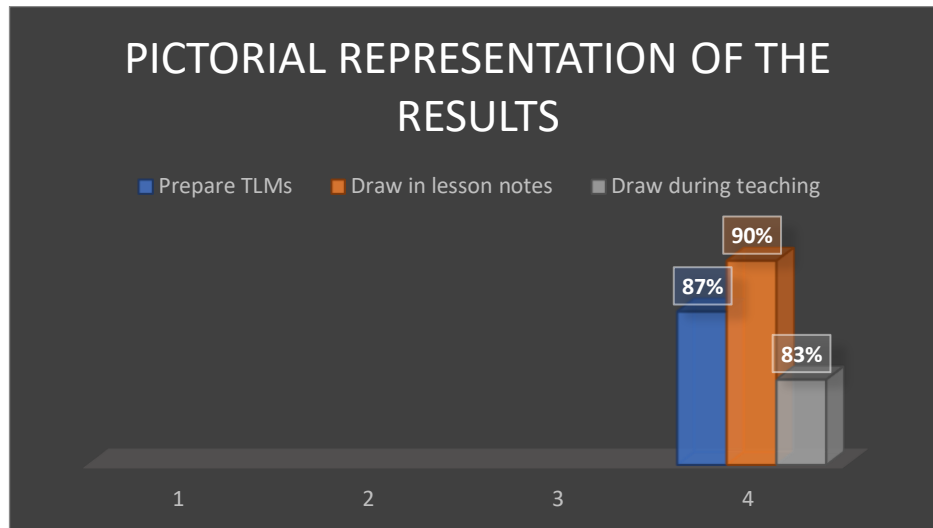
Figure 5: A teacher's drawing of a boy and girls

From the study, it came out through the interview that teachers felt reluctant to draw during teaching because they did not have drawing skills. Of the few who were interested in drawing, most of them were not sure of the simple steps to follow in drawing and those who tried to draw entertained fears that they would become the laughingstock of their colleagues. Also, teachers were not confident in drawing the various features of animals and humans. Therefore, a workshop on drawing skills in their view, will go a long way to remedy the situation.

- On the question of how long teachers have been teaching. It was found that 17(57%) of the respondents (teachers) spent an average of four years teaching, 7(23%) have taught between five and nine years and 6(20%) have taught for ten years.
- On the question of teachers' ability to draw, it was realized that one's ability to draw comes with previous knowledge and training in drawing. Naturally endowed skills combined with the willingness to encourage someone to draw. The ability to draw comes with proper training and practice over some time. On the ability to draw, 23(77%) of the respondents (teachers) replied No, and only 7(23%) responded that they could do some little drawing. Other factors that affect one's ability to draw include continuous and repeated drawing, previous knowledge of drawing lessons, and the ability to look and draw and these were revealed during the interviews that were conducted with them.
- On the question of teachers likingness or otherwise to draw. It was realized that out of the 30(100%) respondents (teachers) interviewed, 20(67%) of them responded that they like drawing. Ten (33%) also answered that they did not like drawing. This is largely due to the fears they have harboured over the years. The majority that liked drawing was due to the importance they attached to it, which included developing the manipulative skills that assist children to work, the development of motor skills and an increase in imagination leading to enhancement in the creative process. A total of 26(87%) of the respondents alluded to the fact that TLMs were a major factor in successful lesson delivery and that, it was the next thing to do after preparing lesson notes. A teacher needs to be able to draw in the lesson notes to show their drawing techniques and make the lesson lively. All the respondents (teachers) indicated they always try to draw in the preparation of the lesson notes. This calls for serious interventions to equip them with the requisite skills to be able to draw in the preparation of their lesson notes.

Table 1: Teachers' responses on frequency of drawing

Frequency of drawing	Yes (%)	No (%)	Total (%)
Prepare TLM's	26(87%)	4(13%)	30(100%)
Draw in lesson notes	27(90%)	3(10%)	30(100%)
Draw during teaching	2(7%)	28(83%)	30(100%)



Preparing TLM is necessary because of its importance in the teaching process. As indicated in Table 1, though 26(87%) of the respondents responded that they draw when preparing TLMs, a considerable number of 4(13%) revealed that they are not able to draw when preparing their TLMs, a situation that requires serious attention, if the impact of drawings in preparing TLMs can be felt. They added that, preparing TLMs before teaching makes the teaching process lively and permanent. Besides, drawing during the teaching process is of utmost importance; however, the number of teachers who could not draw on the board while teaching was 28(83%) as indicated in Table 1. All the responses given in Table 1 suggested that the teachers lack the required drawing techniques; therefore, need training in drawing techniques to be able to go about these tasks smoothly.

Table 2: Teachers' responses on their ability to draw domestic animals

Domestic animals	Yes (%)	No (%)	Total (100%)
Cat	4(13%)	26(87%)	30(100%)
Dog	1(3%)	29(97%)	30(100%)
Fowls	3(10%)	27(90%)	30(100%)
Parrot	8(27%)	22(73%)	30(100%)

From Table 2, it was difficult for respondents (teachers) to draw a dog, fowl, cat and parrot. Only 8(27%) of the respondents could easily draw the parrot but 22(73%) of the respondents could not draw it due to the intricate features of the feathers. Also, 29(97%) respondents could not draw a dog as indicated. Drawing a dog comes with a lot of difficulties because the dog has a considerable rigid feature. It can be fun but it requires hard work, as each breed of dog has its own peculiar characteristics and body shape that may be complex to draw. Some have fluffy, small and bushy tails and the shape of their head comes with different styles and shapes.

However, it is always easy to draw a dog by making a head shape, drawing the snout and presenting the circle as the fluffy ears, perfectly making the eyes look friendly and moving.

Table 3: Teachers' responses on their ability to draw vegetables

Vegetables	Yes (%)	No (%)	Total (%)
Pepper	5(17%)	25(83%)	30(100%)
Tomatoes	6(20%)	24(80%)	30(100%)
Garden eggs	20(67%)	10(33%)	30(100%)

Generally, most of the respondents agreed that drawing vegetables was not an easy task as shown in Table 3. From the table, 83%, 80% and 33% of the respondents responded they could not draw pepper, tomatoes and garden eggs with ease. However, 20(67%) of the respondents could draw garden eggs with little challenges. The only challenging aspect was fixing the stalk on the ball and you are done. Besides, it is easy to master the drawing of vegetables since many of them are quite similar in shape, and so by mastering the shapes you are on the move to master their drawings (Nguyen & Wood, 2020).

Table 4: Teachers' responses on their ability to draw fruits.

Fruits	Yes (%)	No (%)	Total (%)
Pear	2(7%)	28(93%)	30(100%)
Pineapple	2(7%)	28(93%)	30(100%)
Orange	24(80%)	6(20%)	30(100%)
Apple	20(67%)	10(33%)	30(100%)

Table 4 shows the drawing of fruits (for example, pear, pineapple, orange and apple). Twenty-four (80%) respondents find it easy to draw an orange, with 6(20%) respondents having difficulties drawing it. Although fruits are easy to draw because of their simple shapes and forms, some of them are more complicated than others. From Table 4, the pineapple and the pear are the most difficult to draw as both show 28(93%) respondents respectively.

Records from the interviews indicated that some teachers find it easy to draw the banana. According to them, drawing the banana was easy because you simply started by making simple curves and adding some finishing touches. One can equally start by drawing a horizontal curve that goes upward, just like drawing a smile and use the curve as a baseline for the banana, and add the details until the finishing.

Table 5: Teachers' responses on their ability to draw humans and other body parts

Human beings and Parts	Yes (%)	No (%)	Total (%)
Face	2(7%)	28(93%)	30(100%)
Baby	4(13%)	26(87%)	30(100%)
Man	6(20%)	24(80%)	30(100%)
Woman	2(7%)	28(93%)	30(100%)

In the responses as per Table 5, 28(93%) of the respondents could not draw the face and woman respectively because of the difficulty in setting the proportions down. The proportions for drawing the female are different from that of the male. Also, in drawing a realistic face, one has to start with a circle or oval draw the guidelines on the face and draw the eyes in the right spot with the nose proportionally. Then keep adding the features until a complete face is obtained. Drawing a baby was also quite difficult for the majority of the respondents which was 26(87%) because the features of the baby if not portrayed well will end up as an adult.

Table 6: Teachers' responses on their ability to draw plants

Plants	Yes (%)	No (%)	Total (%)
Flower	10(33%)	20(67%)	30(100%)
Coconut	28(7%)	2(93%)	30(100%)
Tree	4(13%)	26(87%)	30(100%)

From the responses obtained, as many as 26(54%) respondents found it difficult to draw a tree. Only 4(13%) respondents could draw a tree completely. Drawing a tree may be a great exercise in developing the skill. Thus, one may be tempted to go simple especially if you don't have the requisite skills, as you draw what you see and not what you think you know (Johnston, 2018). As a beginner in drawing, you need to have a general picture before you focus on the details and you first need to set the general base. For example, one has to have a general form of the image with a few subtle times and dots. In drawing the trunk, one must first draw the lower part wider and the bigger the tree the shorter and thicker the trunk. Then comes the branches on top and the side.

Table 7: Teachers' responses on their ability to draw non-living things

Non-living things	Yes (%)	No (%)	Total (%)
Car	8(27%)	22(73%)	30(100%)
Table	10(33%)	20(67%)	30(100%)
Box	25(83%)	5(17%)	30(100%)

Drawing of a box was simple and easy as depicted in Table 7. Twenty-five or (83%) of the respondents could draw the box with ease, as a result of it being simple and transparent. Respondents could also draw a car with a transparent body with a lot of satisfaction exhibiting their childhood type of drawing. From Table 7, 8(27%) could draw a car and 22(73%) could not.

- On the question of whether teachers agree that the Drawing Techniques Development exercise will improve their drawing, all 30(100%) teachers responded in the affirmative, which suggested an immediate need for the program. When the teachers were asked about their preparedness to be taken through the skills training on drawing, they were eager and ready. They realized that such a programme would not only enhance their skills but also equip them to overcome the fear of drawing.

Drawing is not a natural skill or something one is born with as many believe. It is about training an individual to see what they draw in different ways. This training centers primarily on observation and perception by the individual. During a drawing program, one should not erase all mistakes drawn on the paper, instead, he/she should learn to draw over and embrace them along the line. In the course of the drawing, one must draw lightly at first and then increase the drawing tempo gradually. We must therefore learn to look at things in the world of shapes and not as objects they represent (Marina, 2020).

Intervention

English language and Science syllabi have topics such as plants, animals, and inanimate objects, among others. The topics that were employed for the intervention (drawing techniques) were organized in sessions for three days. During the intervention, the researcher (as a resource person) took teachers through a series of drawing techniques notably; handling the pencil, still life drawing, using numerals as a drawing guide, drawing lines to form shapes, and drawing techniques among others. The principles that were followed to improve teacher drawing techniques are stated below:

- a) Handling the Pencil

- b) Positioning an Image in Drawing
- c) Using Numerals as a Drawing Guide
- d) Using Alphabets as a Guide
- e) Drawing with Lines and Shapes
- f) Drawing with Shapes

Handling the Pencil

Teachers were taken through pencil handling. Most people handle the pencil in such a way that it is difficult to draw. There is a right way to handle the pencil as recommended for drawing. Although the tripod grip is the most common way of holding a pencil, many people are not able to hold it correctly. The way one draws will depend on how flexible a pencil is handled. Some teachers who prefer extended grip and overhead grip were encouraged to do so. Others who wanted to draw while standing were allowed, but make sure one's arm had full range of the movement. Plates 1 to 4 are pictures of participants handling the pencil in the drawing.



Plate 1: A teacher ready for drawing exercises



Plate 2: The researcher guides teachers on handling pencils

Using Numerals as a Drawing Guide

Using numerals or numbers as a guide in drawing is one of the easiest ways of learning drawing. Before a child learns to write, he or she might have learned scribbling which is the basics of drawing. Consequently, writing numerals is a drawing of a kind. Building upon numbers as a drawing guide enables teachers to catch the drawing skills with ease. For example, the numeral one (1) was used to draw a ship, canoe and box. The numeral five (5) was used to draw a bird and other features. Samples of these are in Plates 3 and 4.



Plate 3: The researcher drawing numeral '5' as basics of drawing



Plate 4: Researcher developing numeral '5' into forms

Using Alphabets as a Drawing Guide

The alphabets have 26 letters and every child who has passed through formal education has mastered the writing of these letters just as the teachers. Each alphabet offers a clue or guide in drawing an object. During the intervention, the letters were used as a guide to draw several objects including an orange, a house, an ant and a tree.

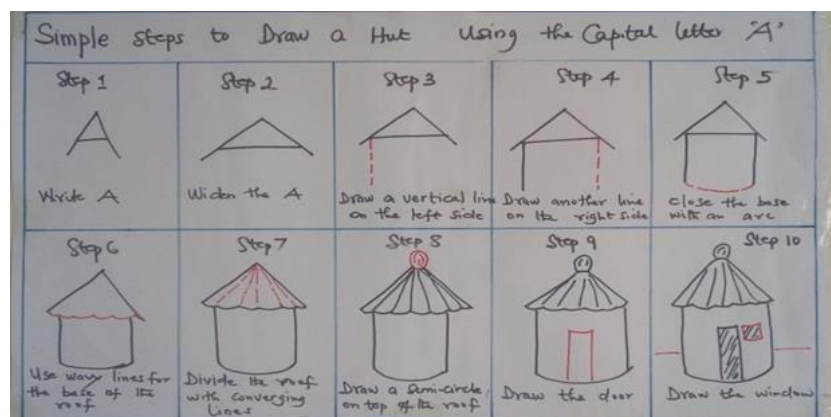


Figure 6: Using the alphabet 'A' as a drawing guide to draw huts

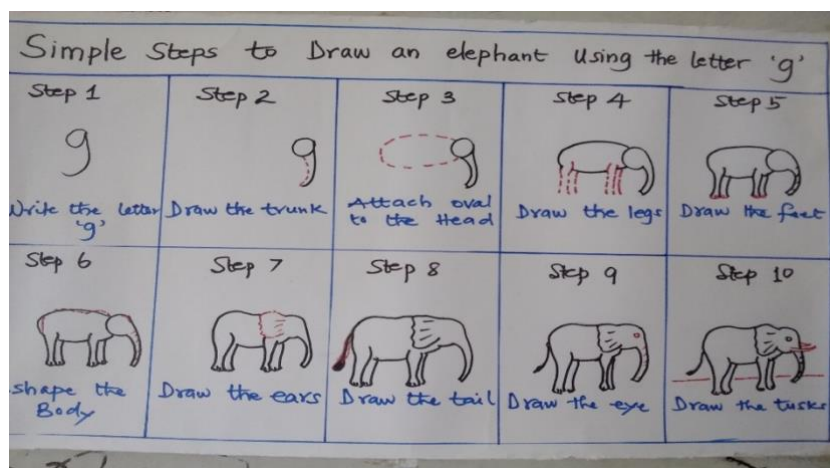


Figure 7: Example of using the letter 'g' as the basics of drawing an elephant

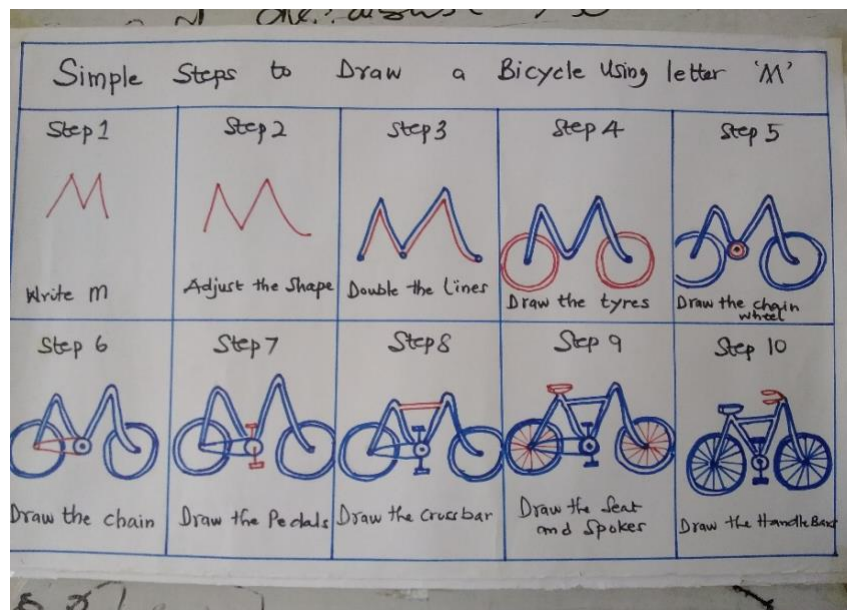


Figure 8: Example of using letter 'M' as basics of drawing a bicycle

Drawing with Lines and Shapes

Layout lines and shapes make it easy to draw elements (Gareth, 2020). In reality, lines do not exist and those lines that exist are edges of objects. Lines are man's creation which are used to represent and mimic objects and figures that we see and those that we see as lines are but our observations of an object's edge (Glattfelder, 2019). It is a basic element of art that one would never conceive a single work of art without the application of lines. Lines enable artists to create both space and image.

There are so many kinds of lines that vary in terms of length, width, value and many other ways. In form, there can be straight, curved, wavy, and jagged and many others. The range of values of lines from light to dark is a product of pressure placed while drawing these lines.

Drawing with Shapes

Before the drawing, teachers were made to understand that drawing is seeing. The object that one draws is made up of basic lines and shapes all put together in a certain way. The basic shapes of circles, ovals, triangles, prism, squares, and rectangles can be transformed into cubes, cuboids, cylinders, and cones, among others.

In looking around a room, one can find objects in the form of circles such as door knobs, light fixtures and heads of people. Objects in the form of squares include picture frames, and window planes, to mention a few. In drawing an animal, one sees shapes such as circles for its heads, legs and paws. To begin drawing, shapes must be drawn first. It must be drawn light, small and may have to be erased later. More is then gradually added but serious attention should be paid to areas where the shapes meet and intercept. In drawing the line, one should remember not to follow exactly what is seen. One should use the guidelines after they have drawn the straight and curved lines and all extra lines should be erased because they are no longer needed.

Drawing and Still Life Drawing

Drawing well means, one must understand what drawing techniques he/she is using and how it is being applied. Teachers were made to understand the proportions of the objects in relation to each other and their shape as well as the negative spaces between them. Maximum

use of the paper area was encouraged as well as the depth and use of contour lines involving the variety of lines. The major drawing technique participants were introduced to was outline drawing which involves the use of straight or curved lines. Shading techniques such as hatching and pointillism were used to add texture to the forms.

- **Proportion**

If you want to draw objects proportionately, employ appropriate techniques that will train your eyes over a period of time. Much time must be spent on measuring, comparing, re-measuring and re-comparing of the object that is being drawn. Teachers were made to spend more time trying to improve the accuracy of their drawings by using the measuring techniques as possible. They were asked to measure before during and after the drawing exercise. This made it easy to see and familiarize themselves with the object being drawn. The participants were encouraged to use the technique wherever they deemed it fit and they were never to leave measuring to the very end. The more they did it, the faster they became over time as they tuned their eyes to draw more accurately. The more time they spend trying to improve the accuracy of your drawing, the better they become.

- **Outline Drawing**

Outline drawing in this regard consists of a drawing showing external lines. Teachers were made to draw birds, elephants, dogs and many more.

- **Shading Techniques**

Shading is the process of applying varying levels of darkness to create the illusion of form and depth. Aside from practicing proper shading and blending techniques, a good understanding of light, planes and contours is crucial for turning a flat line drawing into a realistic portrait that conveys the illusion of form to bring your drawing to life. The teachers were taken through various pencil shading techniques. They were made to understand pencil grades by introducing them to graphite pencils. They shaded with one pencil and later with a variety of pencils. They were also taken through hatching, cross-hatching, smudging and contour shading. In addition, pencil shading tips and tricks including how to shade smoothly, increase the range of motion and use the right amount of pressure, value consistency, understanding of light, the light and dark side and cast shadow were also introduced.

- **Positioning in Drawing**

Teachers had to have the right posture for the right arm and hand movement. It has been recommended that; one works while standing at ease since that gives the drawer a little perspective on what he/she is doing. Therefore, one has to stand away from the drawing from time to time and you may be surprised if you walk four or five feet away and take another look. You should also learn to draw with your arm; moving your shoulder but if most of the time the movement is in the wrist, your drawing will be tight, cramped and ugly (Zagrobelska, 2015). A right-handed person must put the easel to the right and vice versa. When you work sitting down, you need to position yourself the same way if there is an easel. Without an easel, try to have the same face you are working on at an angle of 45 degrees. That is, you have to hold the drawing board and paper or pad of paper, which should be held at roughly a 45-degree angle.

- **Still Life Drawing**

A still-life drawing is a work of art showing nonliving objects from man-made and natural environments. It depicts things that are still and do not move. For the teachers to draw realistically in still life, they were made to recognize three things, that is, how a person sees from reality, how well he or she remembers visual information from one moment to the next and the element of an object selected to draw. For them to draw well, they were encouraged to see the objects as it and to draw. Figures 9 and 10 depict still-life drawings by the teachers.



Figure 9: Still life drawing by a teacher



Figure 10: Another still-life drawing

Challenges Encountered during the Basic Drawing Techniques Development Exercise

There is no study of this nature without its peculiar challenges. Some of the major challenges were inadequate tools and materials needed for drawing as some of the teachers came without them. Another challenge faced was time constraints as there was not sufficient time to attend to every teacher who needed attention. There were several anxieties as participants were eager to start acquiring the drawing techniques prepared for them.

Some of the teachers were making repeated mistakes due to pressure to finish before the stipulated time. Others were comparing their works and thus, they were erasing portions repeatedly. The angle from which you are looking at a person will affect the alignment of the facial features of a person. Because participants were used to looking at a person straight on, they were tempted to make the features of the person look straight also. The head at an angle results in strange distortions in our drawing. This needed more time to be corrected using construction lines. Participants disrupted the illusion of tonal value by drawing hardlines to define the edges of the tones. The participants later overcame their problems and mistakes, which rather helped them to learn better.

Assessment of drawing

It is nearly impossible to define what art is, because, we get into complicated waters when we want to discuss an impressive artwork (Hospers, 2020). When one asks a group of students or an individual about a good artwork, he/she is likely to get conflicting answers.

For an assessment of a good artwork, one must adhere to the principles and elements of design. It is therefore important to look at how lines, shapes and colour have been utilized in the artwork for it must be true to life and illicit feeling from the audience and finally fill us with emotions. The drawings of the teachers satisfied the principles of design, truth to life, feelings of emotions and good composition which convey a message to the world.

Evaluation of the Standard of Drawing

Setting a standard is a quality of excellence, attained by an individual which is accepted as a norm by which actual attainments are judged as a unit of measurement (OECD, 2013). To set a standard for drawing is a reasonable attempt because students need to know in order to become artistically literate and be guided in their work. It is concluded in this research that if Art Teachers are made to adopt and use strict standards in drawing, it will go a long way to help them deliver quality lessons. What makes a good drawing is subjective, however, the amount of details, the use of light and shadow, the degree of realism, perspective and skillful composition amongst others go a long way to qualify a drawing as good.

Creativity

Creativity in drawing is a secret weapon of the artist. Without it, the techniques of drawing have no use. It is important to communicate your ideas and problem-solving in the most creative way possible (Tripathy, 2018). Teachers were taken through idea development and eventually creative skills. The point here was not to draw and create masterpieces but instead to improve their drawing skills through creativity.

As a result of the intervention, there was mastery of tool handling especially with the pencil, which enabled the participants to observe and make bold drawings with precision. Some drawings were also refined, regular, straight and systematic. Teachers could also shade in three tones making their drawings more real and interesting to observe because they are intricate and crafted with greater details than drawing with large simple shapes.

Making use of light and shadow had a large impact on the drawings. Participants had drawings that looked real because of their ability to combine light and shadow. The use of the lighting situation alone made their drawings stand out looking interesting. The addition of perspective to some drawings resulted in enhanced work.

Conclusion

The integration of basic drawing techniques into the teaching and learning of science and English language in primary schools within the Sekondi-Takoradi Metropolis is a valuable pedagogical approach. It enhances students' comprehension, creativity, and critical thinking skills, making abstract concepts tangible and accessible. This study underscores the potential of drawing as a multifaceted instructional tool that bridges language and science education, fostering an engaging and inclusive learning environment. The findings advocate for teacher training, curriculum adjustments, and resource allocation to maximize the benefits of visual literacy in primary education.

- The majority of the teachers spent an average of four years in teaching while a minority of them have been teaching between five to ten years. Hence, the teachers who teach pupils in Primary are youthful since most of them have taught between one and four years.
- The majority of the teachers have no drawing skills and techniques since they did not pursue art-related programmes at the training institutions; hence, do not know drawing whereas a minority stipulated that they could do some little drawing.
- Most of the teachers were interested in using drawing in the lesson preparation and delivery because of the importance they attach to drawing; such as developing the manipulative skills to assist children in learning, developing children's motor skills and increasing imagination leading to enhancement in the creative process. Conversely, the few teachers who were not interested in drawing were a result of the fears they had harbored over the years.
- The majority of the teachers alluded that TLMs were a major factor in successful lesson delivery and that, it was the next thing to do after preparing lesson notes. A teacher needs to be able to draw in the lesson notes to make the teaching of topics and concepts more effective so that pupils will easily understand what is taught in primary one classroom.
- Most teachers indicated that they draw when preparing TLMs; meanwhile, the majority established that although drawing during the teaching process is of utmost importance, they are not able to draw on the whiteboard or blackboard during teaching. These suggest that the teachers lack the needed drawing techniques to enable them to draw during teaching sessions.
- The majority of the teachers lacked the needed drawing techniques to draw simple domestic animals (dog, fowl, cat and parrot), simple vegetables (pepper, tomatoes and garden eggs) and simple fruits (pear, pineapple, orange and apple) to enable pupils to

understand the concept taught during teaching sessions; although, it is easy to master the drawing of vegetables since many of them are quite similar in shape.

- The development of the basic drawing techniques for teachers who teach Primary One pupils was based on simple items and elements such as Alphabets (A, g and M to draw a hut, elephant and bicycle respectively); Numbers (6 to draw a cat and 5 to draw a bird), Shapes (circles, ovals, triangles, prism, squares, and rectangles); and forms (cube, cuboid, cylinder and cone) to draw simple objects like a bird, house, animals, dog, cat, duck, fish, and persons (girl and boy).
- Teachers who teach Primary One pupils were interested, prepared and ready for the training on basic drawing techniques, therefore, they fully partook in the exercise. This improved their techniques for drawing simple objects for teaching.

Recommendations

After careful consideration of the data collected for the study, the succeeding recommendations are put for deliberation by the Ministry of Education and Ghana Education Service and not exclude relevant stakeholders in primary school education in Ghana to mitigate the challenges that teachers encounter in drawing in Primary One classrooms.

- First and foremost, resource persons in the field of drawing such as facilitators from the Faculties of Educational Studies and Art should be invited to organize workshops, fora and seminars on Basic Drawing Techniques to train teachers who teach Science and English language to Primary One pupils so that they can draw and incorporate simple objects like a car, a house, a boy, a girl, a bird, among others, into their teaching to achieve effective teaching and learning of the concepts in the subjects.
- Again, the Heads of School should organize in-service training in Basic Drawing Techniques for teachers who teach Primary Two pupils so that it will arouse their interest in drawing and equip them with the requisite drawing techniques so that they can incorporate them in their lesson preparation and teaching sessions in Science and English Language.
- Moreover, Ghana Education should employ professional artists in the classrooms to assist teachers who have no knowledge, skills and techniques in drawing-by-drawing simple objects accurately to ensure that pupils understand concepts taught in Science and English Language effectively.
- Constant organization of workshops and refresher courses by the Government, GES, NaCCA and the Art Teachers Association of Ghana will provide remedies for the challenges that teachers face in drawing so as to improve the teaching and learning of Science and English Language.
- The Government, through the Ghana Education Service (GES) and policymakers, should formulate policies to allocate and provide funds, adequate resources (such as tools, materials and equipment) and infrastructure in support of developing teachers' drawing techniques in the primary schools.
- Curriculum developers in collaboration with instructional designers should revise the training that is given to primary school teachers to incorporate basic knowledge, skills and techniques in drawing so that they will acquire basic drawing techniques for effective teaching.

References

- Altrichter, H. P., Posch, P., & Somekh, B. (1995). *Teachers Investigate their Work: An Introduction to the Methods of Action Research*.
- Allan, P. (1971). *Imagery and Verbal Processes*. Winston in New York. Holt, Rinehart.
- Anim, J. O. (2012). *The role of drawing in promoting children's communication*. pp.1–66.
- Archer et al. (2015). *Is Science for Us? Black students' and parents' views of science and science careers*. DEPS, King's College, London, UK, Graduate School of Education, Standford University, Stanford, CA943405, USA, Published online 18 February 2015 (Wiley online library.com)
- Ary, D., Jacobs, L. C., & Razavieh, A. (2002). *Introduction to research in education* (6th Ed.). Belmont, CA: Wadsworth/Thomson Learning.
- Atkinson, R., & Sbiffrin, R. (1968). Human memory: A proposed system and its control processes. In Spence, K., & Spence, J. (Eds.), *The psychology of learning and motivation* (Vol. 2). New York: Academic Press.
- Bartel, M. (2010). How to Teach Drawing to Children. Retrieved May 5th 2022 from (<http://www.goshen.edu/art/ed/draw.html>)
- Bigozzil L. Tarchi C., Fiorentini C. Falsini P & Stafanell F. (2018). *The Influence of Teaching Approach on Students Conceptual Learning in Physics*. Department of Education and Psychology, University of Florence, Italy (www.frontiersin.org)
- Brooks, M. (2003). Drawing, thinking, meaning. TRACEY, <http://www.lboro.ac.uk/departments/ac/tracey/thin/Brooks.html>.
- Brooks, M. (2002). Drawing to learn. Unpublished PhD thesis. University of Alberta, Canada.
- Brooks, M. (2009). Drawing, visualization and young children's exploration of "big ideas." *International Journal of Science Education*, 31(3), 319–341.
- Bruner, E. M. (1974). *The expression of ethnicity in Indonesia*. (pp. 149). Tavistock Publications.
- Cohen, L. & Manion, L. (1994). The interview. *Cohen L. & Manion L. Research Methods in Education* (4th ed.). London: Routledge.
- Cox, K.R. (1992). *User-driven design versus algorithmic driven design for systems development*. Working Papers of Department of Computer Science the City Polytechnic of Hong Kong. pp. 2-11.
- Creswell, J.W. (2003). A framework for design. *Research design: Qualitative, quantitative, and mixed methods approaches*, pp. 9-11.
- Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied developmental science*, 24(2), 97-140.
- Davies, R., Teall, O., Pilegis, M., Sweeney, J., Jefferson, T., Lark, R. & Gardner, D. (2018). A shape memory polymer concrete crack closure system activated by electrical current. *Smart Materials and Structures*, 27(7), 075016.
- De Martin, F. (2013). Impact of geometric effects on near-surface Green's functions. *Bulletin of the Seismological Society of America*, 103(6), 3289-3304.
- de la Roche, R. S. (1996). Collective violence as social control. In *Sociological Forum* (Vol. 11, No. 1, pp. 97-128). Kluwer Academic Publishers-Plenum.
- Driscoll, M. P. (1994). *Psychology of learning for instruction*. Allyn & Bacon.
- Duchastel, P. C. (1978). Illustrating instructional texts. *Educational Technology*, 18(11), 36-39.
- Essel, H. B., Tachie-Menson, A., Amponsah-Fordjour, A. & Appiah, I. K. (2016). Analytical Study of the Implications of Text Illustrations on Lower Primary Pupils' Construal in the Classroom: The Case of Illustrations in Ghanaian Language and Literacy Textbook. *Learning*, 59.

- Farrant, J. S. (1996). *Principles and Practice of Education*. Singapore: Longman Singapore Pub. Pte Ltd.
- Farthing, S. (2011). The bigger picture of the drawing. In *Thinking through drawing: practice into knowledge. Proceedings of an interdisciplinary symposium on drawing, cognition and education*. New York: Columbia University (pp. 21-25).
- Fay, B. (2013). *What is Drawing - A Continuous Incompleteness*. Irish Museum of Modern Art, Dublin.
- Frimpong R. A., Amish C. A. & Owusu, M. (2018). The effect of culture on the Teaching and learning of Science at the Basic schools in Ghana. *Journal of Education and Practice*, uploaded online on 29, July 2019 (www.iiste.org).
- Fussell, L. (2019). Forging new worlds: high-resolution synthetic galaxies with chained generative adversarial networks. *Monthly Notices of the Royal Astronomical Society*, 485(3), 3203-3214.
- Garrett, V. (2020). *Chinese Dress: From the Qing Dynasty to the Present Day*. Tuttle Publishing.
- Gerhard, O., Saglia, R. P., Fabricius, M., Bender, R., Montalto, M., Lee, C. H., Riffeser, A., Seitz, S., Morganti, L., & Hopp, U. (2010). The old and heavy bulge of M 31-I. Kinematics and stellar populations. *Astronomy & Astrophysics*, 509, A61.
- Glaserfeld, E.V. (1991). An exposition of constructivism: Why some like it radical. In *Facets of systems science* (pp. 229-238). Springer, Boston, MA.
- Glattfelder, J. B. (2019). The consciousness of reality. In *Information—Consciousness—Reality* (pp. 515-595). Springer, Cham.
- Gottesman, M. S. (2018). *Third Generation Holocaust Survivors in the Field of Psychology: An Interpretive Phenomenological Analysis* (Doctoral dissertation, The Wright Institute).
- Grover, B. (1996). Dictation drawing. *ITESLJ (The Internet TESL Journal)*.
- Grove, J. W. & Burns, N.H. (2003). Experimental assessment of factors affecting transfer length. *Structural Journal*, 100(6), 740-748.
- Hall, J. K. (2007). Redressing the roles of correction and repair in research on second and foreign language learning. *The Modern Language Journal*, 91(4), 511-526.
- Haber, N. (2020). Making emotions transparent: Google Glass helps autistic kids understand facial expressions through augmented reality therapy. *IEEE Spectrum*, 57(4), 46-52.
- Hausman, J. (1994). Standards and assessment—New initiative and continuing dilemmas. *Art Education*, 47(2), 9-13.
- Hawkins, B. (2002). Children's drawing, self-expression, identity and the imagination. *International Journal of Art & Design Education*, 21(3), 209-219. (https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Hawkins%2C+B.+%282002%29.+Children%E2%80%99s+drawing%2C+self-expression%2C+identity+and+imagination.+Journal+of+Art+%26+Design+Education%2C+21%283%29%2C+209-219.+doi%3A+10.1111%2F1468-5949.00318&btnG=)
- Hopperstad, M. H. (2008). How children make meaning through drawing and play. *Visual Communication*, 7(1), 77-96. (https://scholar.google.com/scholar?q=related:NbnzPdFI7zQJ:scholar.google.com/&scioq=&hl=en&as_sdt=0,5)
- Hutter, H. R. (2017). "Drawing". *Encyclopedia Britannica*, 28 Sep. 2021, <https://www.britannica.com/art/drawing-art>. Accessed 5 September 2022.
- Kabir, S. M. S. (2018). Psychological health challenges of the hill-tracts region for climate change in Bangladesh. *Asian Journal of Psychiatry*, 34, 74-77.
- Kimon, N. (2001). *The Natural Way to Draw*. Boston, United States of America: Houghton Mifflin Company.
- Kochhar, S. K. (1984). *Teaching of history*. Sterling Publishers Pvt. Ltd.

- Kress, G. (2005). *Before writing: Rethinking the paths to literacy*. Routledge. [https://scholar.google.com/scholar?cluster=6517917297923032272&hl=en&as_sdt=0,5&as_vis=1#d=gs_cit&t=1662474432060&u=%2Fscholar%3Fq%3Dinfo%3A0IQTwj9LdFoJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26scf%3D1%26hl%3Den~:text=Kress%2C%20G.%20\(2005\).%20Before%20writing%3A%20Rethinking%20the%20paths%20to%20literacy.%20Routledge.](https://scholar.google.com/scholar?cluster=6517917297923032272&hl=en&as_sdt=0,5&as_vis=1#d=gs_cit&t=1662474432060&u=%2Fscholar%3Fq%3Dinfo%3A0IQTwj9LdFoJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26scf%3D1%26hl%3Den~:text=Kress%2C%20G.%20(2005).%20Before%20writing%3A%20Rethinking%20the%20paths%20to%20literacy.%20Routledge.)
- Lee, D. (2000). *Teaching Philosophy*. Retrieved on 18th March, 2012 from <http://dongjunelee.org/teaching.html>.
- Leedy, P. D. (2005). *Practical Research: Planning and Design*. Upper Saddle River, New Jersey: Pearson Education Inc.
- Leedy, P. D., & Ormrod, J. E. (2010). *Practical research: Planning and design* (9th ed.). Upper Saddle River, NJ: Prentice Hall.
- Lefrançois, G. R. (1997). *Psychology for teaching* (9th ed.). Belmont, CA, Wadsworth Pub. Co. <https://cmc.marmot.org/Record/b31000666>
- Lowenfeld, V. (1965). *Your child and his art: A guide for parents*. New York: The Macmillan Company. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=.+Lowenfeld%2C+V.+%281965%29.Your+child+and+his+art%3A+a+guide+for+parents.+New+York%3A+The+Macmillan+Company&btnG
- McCombs, B. L. (2007). *Learner-centered classroom practices and assessments: Maximizing student motivation, learning, and achievement*. Corwin Press.
- Mei Chi Lee & Fauziah S. (2017). The Effectiveness of practical work on Students' interest towards learning Physics. *International Journal of Humanities and Social Science Invention*, accepted on 8, September 2018 (www.researchgate.com)
- Mitter, G. A. & Howze, J. (2007). *Creating and Understanding Drawing, Studio, Aesthetics, Criticism, History*. New York, United States of America: Macmillan/McGraw-Hill.
- Morkeh, J. (2020). Innovative rockfall solutions based on calibration and field testing. *Mining, Metallurgy & Exploration*, 37(1), 101-116.
- Nelson, L., Potrac, P., Gilbourne, D., Allanson, A., Gale, L. & Marshall, P. (2013). Thinking, feeling, acting: The case of a semi-professional soccer coach. *Sociology of sport journal*, 30(4), 467-486.
- Nketsia, W. (2003). Teacher education and inclusion in Ghana: Pre-service teachers' preparedness for creating an inclusive classroom.
- Piaget, J. & Inhelder, B. (1956). *The child's conception of space* (FJ Langdon & JL Lunzer, trans.). London: Routledge & Kegan Paul.
- Piaget, J., & Inhelder, B. (1969). *The Psychology of the Child* (H Weaver, transl.). New York: Basic Books.
- Pilot, D. F. (1999). *Hungler. Nursing Research* (5th ed.). Philadelphia. JB Lippincott.
- Schumacher, S. & McMillan, J. H. (1993). *Education research: A conceptual introduction*.
- Sidhu, J. (2003). Mission Statements: Is it Time to Shelve Them? *European Management Journal*, 21(4), 439-446.
- Swapp, N. (2016). *Creativity and academics: The power of an arts education*. Edutopia: George Lucas educational foundation, para. 1, 4, 8. Retrieved from: <https://www.edutopia.org/blog/creativity-academics-power-of-arts-education-nell-swapp>
- Taylor, A. (2014). Why drawing needs to be a curriculum essential. *The Guardian Newspaper, International edition*. <https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2014/may/29/drawing-needs-to-be-curriculum-essential-education>
- Wikidata - Wikipedia the free encyclopedia, 2017.