

Graphics Mirror: Re-Emphasizing Visual Aids

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Abstract

The influence of visual aids on the academic performance of students is a topic of significant interest within the field of education. Visual aids such as images, diagrams, videos and other visual representations play a crucial role in enhancing students' comprehension and retention of information. The primary objective of this study was to examine the contributions of visual aids towards academic performance of Visual Arts students at St. John's, Archbishop Porter's Girls and Fijai Senior High schools in the Sekondi-Takoradi Metropolis. The intent was to identify visual aids as essential instructive instruments and how they impact learning. An exploratory case study approach was used to assess the availability and use of instructional resources that explanatory research has attempted to explain. A sample size of 15 participants was used. Data was collected through interviews, focus group discussion, observation and documentary review. A thematic approach was used for data analysis. The study found that visual aids maintained students' interest, improved comprehension, recall and retention of information. Students' perceptions of visual aids revealed that their absence promotes abstract presentations, making it difficult to grasp concepts, as teachers mostly resort to the use of the whiteboard. Financial constraints were identified as a major teaching challenge. This difficulty has a negative impact on students' academic performance. The research inferred a direct correlation between the use of visual aids and effective student academic performance.

Keywords: *Academic performance, instructional time, memory retention, visual aids, visual arts*

1. INTRODUCTION

‘Active learning’ has become an integral part of learning experience and education is on the lookout for how teachers and instructors provide effective instruction and ways to increase rigor and students’ successes in the teaching space (Kuh et al., 2010). In most academic settings, research is interested in a reciprocal availability of instructional facilities, where the number of schools and enrollments are increasing while materials to facilitate learning are inadequate or in sorry state (MoEVT, 2010; Baafi, 2020). The fallout heightens the gap in secondary education and the realities existing in schools. A gap in the literature exists which focuses on visual aids used by teachers, which includes their perspectives, experiences, and factors that determine the use of visuals during instructional time (Shabiralyani et al, 2015; Samuel, 2019).

Graphic is an adaptation from the Greek word “graphos” meaning: to write graphically and to draw out art forms, either for illustration message or communication (Oladumiyte, 2014). Graphic images attract and hold students’ attention, help to recall, aid detailed study, correct misconceptions and build new experiences. On the contrary, “Mirror” evokes strong feelings and is a powerful tool for changing our perspective and perceiving hidden outlooks (Well, 2020).

‘Graphics Mirror’ highlights essential visual aids which appeals to sight and used to enhance teaching and learning.

An undisputable teaching approach has been deploying graphic images in explaining issues, concepts, ideas, theories, hypotheses and principles evident in the performance of students (Adeogun, 2001). Significant research has found that learning is improved by well-communicated images (Chen, 2004) in a world where attention spans are short and time-constrained. Visuals create understanding where words alone cannot; bridge the gap between concepts and words, especially when appealing to an audience with diverse needs and backgrounds (Nediger, 2020). From the perspective of Westhuizen (2020), humans are ‘visually wired’; 20-30% of the cerebral cortex is involved in visual processing, more than 80% of information processed is visual, and visuals communicate information 60 000 times faster than text.

Graphic images make a positive first impression, creates retention and influence choices (Chrysalis Communications, 2022). Students remember about 10% of what they read, 20% of what they hear, but 90% of what they do (Lee & Reeves, 2007). Lee and Reeves assertion confirms that “active learning” can result in up to 90% retention. Fortunately, visual formats have been found to improve comprehension of detailed information. Colour images inspire learning by 80%. When people need to follow instructions, they do so 323% better when there are illustrations (Westhuizen, 2020).

Padhi (2021) opines that the tendency to forget is associated with every individual and that proper positioning of teaching resources helps to retain more concepts permanently given that teaching aids assists in imparting knowledge from ‘*simple to complex*’, ‘*concrete to abstract*’, ‘*known to unknown*’ and ‘*learning by doing*’ which saves time, money and energy of both teachers and students. The study identifies the indicators of picture-based instruction among St. John’s, Archbishop Porter’s Girls and Fijai Senior High Visual Arts students in the Sekondi-Takoradi metropolis. The aim is to investigate the influence of visual aids on the academic performance of

students' in answering the question: what are the contributions and effectiveness of visual aids towards improvement of the academic performance of Visual Arts students?

2. Theoretical framework

The study is grounded on Allan Paivio's dual-coding theory which states that images and words have different cognitive presentations and the brain uses separate memory systems for different types of information – visual and verbal (Sadoski & Paivio, 2013). The visual system deals with graphical information processing and the verbal system deals with linguistic processing. The dual coding theory is associated with creativity given that nonverbal information can be verbalized, while verbal information can be expressed in mental images. Artists are noted to solving problems without words because images, not words, are primary components of their thinking. The rationale of the theory is to boost students' learning, double their acquisition chances and help them retain information over time. In effect, the dual coding theory has consequences for creativity meaning that the more path ways learners use to remember information, the more cues learners can recall that information later on (Grandson, 2013).

3. METHODOLOGY

3.1 Research Approach

Qualitative research approach combined with structured one-on-one interviews and observations catered for data collection. The approach proved appropriate in order to garner verbal data from a small number of participants (Gastaldo et al., 2018).

3.2 Research Design

Exploratory case study was used to investigate visual aids known for their effectiveness but not utilized. Descriptive research design helped to record the availability and utilization of instructional resources while explanatory design explained the phenomenon.

3.3 Accessible Population

The accessible population comprises of 6 second year Visual Arts students and 6 Visual Arts teachers of St. John's, Archbishop Porter's Girls and Fijai Senior High schools, all from Sekondi-Takoradi in the Western Region of Ghana.

3.4 Sampling Techniques

A combination of stratified and purposive sampling was used to acquire the sample size. In selection of students who offered Visual Arts, stratified random selection, a type of non-probability sampling was employed by the researcher in collaboration with the teachers of the target population to select samples (2 out of 215 second year Visual Arts students) with contributive prowess based on the subjective judgement of the study objective. The stratified technique also took into consideration the number of female and male respondents in the mixed school (Fijai Senior High School). Two students studying Visual Arts for some considerable number of years, knowledgeable and willing to share the instructional resources and teaching strategies that help them in easily understanding the learned content and are able to practice the skills in the course area on their own with little or no supervision were selected from each of the three schools.

A purposive selection was employed to obtain samples from 20 Visual Arts teachers in 3 Senior High Schools. Each school provided two Visual Arts teachers who were more knowledgeable (Gastaldo et al., 2018) in judging the usage and effectiveness of visual aids in the teaching and learning of Visual Arts subjects. They are in the best position to offer an insiders' perspective (Sharif & Cho, 2015) on the appropriate instructional resources and their utilization to produce the desirable results.

Twelve (12) study participants were manageable and their views were enough in reaching the point of data saturation (Gastaldo et al., 2018). In summary, the sampling frame was as follows:

Table 1: Sampling Frame

<i>Category</i>	<i>Total number</i>	<i>Selection</i>	<i>Selection Technique</i>
Students	215	6	Stratified random sampling
Teachers	20	6	Purposive sampling
<i>Total</i>	235	12	

Source: Researcher, 2022

3.5 Data Collection Instruments and Methods

Data were collected through direct interviews using interview guides. Open-ended questions encouraged participants to express their opinions and gave detailed answers. Three Focus Group Discussions (FGDs) were organized for students. FDGs helped in allaying anxieties and assisted students in speaking freely amidst their classmates (Sharif & Cho, 2015). In order to accurately capture data, the interviews were audio recorded, then transcribed and analyzed.

An observation of six (6) teachers; two (2) from each sampled school was conducted randomly without prior notice of the teacher participants to avoid any social reaction effect with the aid of a classroom observation checklist. The observation was in order to ascertain the availability and usage of visual aids taking into consideration a careful and complete observation of the use of effective visual aids to supplement Visual Arts learning and its outcomes. The observations was focused on the types of visual aids used during instructional time, the intended purpose for the visualizations, the manner in which the tool was used, and the apparent comfort level in which the teacher used the visualization as well as to establish if visualization-based instruction was carried out as intended during the planning of the lesson and factors within the classroom which led to the use of visualizations which were not initially planned.

3.6 Data Analysis

Thematic analysis was employed. Creswell (2013) recommends description, analysis and interpretation of the 'culture sharing group'. The initial task is to transcribe the interviews. Then sort out the facts to form patterned regularities in the data. The final stage is to draw inferences from the data while making reference to theories to provide structure.

3.7 Ethical Considerations

Verbal consent was obtained from participants prior to the interviews and assured that their information would remain confidential. In the final report, their identities were replaced with pseudonyms.

4. RESULTS AND DISCUSSION

4.1 Contributions of Visual Aids to the Academic Performance of Students

Different Visual Aids Contribute to Students' Learning

With regards to deploying different visual aids to support learning, the results showed that visual aids such as pictures, photographs, real objects and videos which were used by few teachers during the lesson in the visited schools led to improvement in understanding, recall and retention of learned information.

During a focus group discussion with students from sampled Senior High Schools, the researcher asked students if they understand more and recall information easily when teachers use different visual aids such as real objects, pictures and photographs in teaching.

Student 1:

When pictures are shown in class, we feel excited. We get curious to find out what is the idea in creating them. Seeing pictures displayed around motivates us to practice through imitation. We also learn a lot of things from visual aids which are not taught in class but important in the Visual Arts course (personal communication, September 15, 2022).

Student 2 stated that “artworks create a feeling of excitement. It gives us the motivation to also create imaginative works since most artist create artworks from how they feel about things” (personal communication, August 10, 2022).

The responses gave the indication that students had a positive inclination towards the use of supporting evidence during teaching hours. The students were of the view that the use of visual aids in lessons creates excitement and improves their level of attentiveness. This view validates the opinion that images trigger individuals' emotions and that learners feel motivated to think about visuals the way teachers want them to if teachers present information, in position that the mind is predisposed to grasp (Tavin, 2003; Lohr, 2008).

Apart from improving understanding and recall, the study revealed that visual aids help increasing students' interest and engagement to the lesson.

Student 3:

Some things can be difficult to understand. The language used by teachers may not be well understood. However when something like a picture or an object is used it helps me to understand because I can look at it and observe the information it contains (personal communication, September 9, 2022).

The student's remark was supported by a teacher who explained that visual aids help to promote understanding to students who are not capable of fully comprehending the medium of instruction.

Teacher:

Most of the students I teach struggle with the English language as a medium of instruction. Sometimes, this may result from loss of students' concentration during lesson delivery. However, when I use different visual aids it gives them a glimpse of what is being taught (personal communication, September 9, 2022).

Lending support to this, Yunus *et al* (2013) explains that visual aids assist students to cope with complexity of the language because in addition to listening where they might lose their concentration, visual aids give them an opportunity to see what is actually happening.

Sources of learning aids are the internet, teachers and past students

With regards to the visual aids used in their respective schools for teaching and learning, the responses provided gave the indication that these aids consist of images from books, sketches on the board and practical works of past students.

Student 4 noted that “the elective subject teachers mostly use graphic design works by some past students and some other works of foreign artists like Leonardo Da Vinci, Pablo Picasso and others” (personal communication, August 10, 2022).

Student 5:

Images from books and sketches on the board are visual aids mainly used to teach. Some sculpture works produced by past students are shown to the class as well as pictures of some ancient temples, Greek art and akwaaba doll during history in art lessons (personal communication, September 15, 2022).

Student 6:

In the Graphic Design class, some of the TLMs used are the posters, colour wheel, and signboards. For textiles, motif designs, yarns, loom, sewing kits and fabrics are sometimes shown. For ceramics, you find the throwing wheel, clay and sketches of some wares. As for leatherwork, we mostly make references to our school bags, shoes and wristwatches (personal communication, September 9, 2022).

The responses gave the indication that teachers' make the attempt to use available materials to support lessons but their intervention is not up to expectation.

Improvement of level of understanding and creativity

With regards to the role of visual aids in teaching and learning, the results indicated that the use of these aids in school is meant to improve their level of understanding as well as make students improve their level of creativity and help students gain first hand application or experience of the subject the teacher is presenting at that time.

Student 3:

If the teachers' use visual aids to teach us, it will make us understand what we are taught. But when teaching is done and it is all orals, we struggle to understand. The visual materials help us to verify what the teacher is teaching (personal communication, September 15, 2022).

Student 5 stated that, "visual aids help us to get a clear view of what the teacher is teaching and give a clear idea of what the teacher want us to do" (personal communication, September 9, 2022).

Students' response revealed that visual aid usage would help gain first hand application or experience of the topic and improve understanding and creativity. This idea supports Singh's (2014) view that any device which by sight and sound increase the individuals' practice.

Subjects taught without visual aids tend to be incomprehensible

When asked to give an indication of their perception regarding the difference that exists between subjects taught with visual aid and those which are taught without visual aid, the students were of the view that subjects taught with visual aids tend to be comprehensible than those taught without visual aid.

Student 2:

When visual aid is used, it is really very quick to recall. When you recall the picture, everything taught keeps coming to mind. But lessons without the support of visual aids always demand that you go back to the notes always to make sure that you have the right information (personal communication, August 10, 2022).

Student 4:

Lessons taught with visual aids are exciting and students do not become bored. We feel motivated to practice what we learn. Oral lessons are difficult to understand and some information is forgotten. But with visual aids, as you remember the picture, everything that was taught comes back to mind (personal communication, September 15, 2022).

Student 6:

Without any picture, we do a lot of imagination to find out what the teacher really meant when a topic is introduced. There is a lot of struggle with practicals because the equipment and materials are not there and it makes the subject unattractive (personal communication, September 9, 2022).

This goes to affirm Silverman's (2002) view which states that people have innate tendencies to express themselves visually, and visuals play a big part in how we process information.

Attentiveness and retention is enhanced when information is represented and learned both verbally and visually

All the students interviewed were of the view that visual aids used previously served their purpose; however, there is a need for additional ones which can enhance teaching and learning. The students therefore suggested projectors, computers, looms and potter's wheels.

Student 3 shared the view that “we can get a projector so that anytime we need such information we can easily access it on the internet” (personal communication, August 10, 2022).

Student 1 stated that “teachers who teach practical lessons should try and do some sketches and bring pictures showing the steps involved in the practical work and avoid speaking a lot” (personal communication, September 15, 2022).

Student 5:

We need an art studio. For Graphic design, we need computers so that we learn how to make designs using software. For ceramics, we need a potter's wheel to help us in throwing, and a broad loom for weaving in Textiles (personal communication, September 9, 2022).

These responses encourage verbal and visual information use to help students make connections, understand relationships and recall details.

4.2 Effectiveness of Graphic Images in Enhancing Academic Performance of Students

Relevant learning aids improves academic performance

When asked about what inspires their use of visual aids in instructional discourse, all the teachers generally noted that the few visual aids available proved fairly useful in preparing students to understand, recall and retain learned information. However, the responses revealed the fact that much more relevant and effective visualizations would have improved on academic performance of students.

Teacher 1:

Images communicate message universally unlike text where you need to be literate to understand. Looking at images, as long as there is sight, when you see, you can interpret it. Visual memories are the strongest to remember. What is seen is hardly forgotten. The urge to depend solely on the whiteboard and lots of explanation is absent when visual images are used (personal communication, September 15, 2022).

Teacher 2 indicated that “when the need arise, we try to utilize the available resources to help students understand. Moreover, visual aid lessens the teacher's work tremendously as it avoids a lot of talk and produces a lot of results” (personal communication, August 10, 2022).

Teacher 5:

Pictures turn to stick more than just oral information. Visual aids are able to eliminate all presumptions that teaching without them offers in the minds of students. We use visual aids to help teaching such that students will have a clear idea or understanding of what the teacher want to teach (personal communication, September 9, 2022).

Teacher 6:

Using visual aids in class helps bring what is outside the classroom into the classroom. Visual aids also help not to teach in abstract. When you realize the topic that you are teaching involve much practical work, it warrants that you use much TLM to assist the teaching and promote students understanding (personal communication, September 9, 2022).

Responses suggest that much more relevant and effective instructional aids would have improved on academic performance of students. This response goes to buttress the notion that visuals create understanding where words alone cannot (Nediger, 2020).

Typical visual aids deployed in class

When asked to give indication of the kinds of visual aids used during lesson delivery in their respective schools, previous artworks kept in portfolio, actual package of manufactured products, charts, pictographs, realia and some videos downloaded on mobile phone were mentioned as visual aids mostly deployed in teaching.

Teacher 3:

Charts and pictographs are necessary to illustrate the elements of design such as colour, lines, and shapes along with their uses. These are digital format visual aids which can be accessed in both hardcopy and the softcopy with the help of computers and printers (personal communication, August 10, 2022).

Teacher 4:

Depending on the topic, we sometimes select the best works done by past students which are preserved in the studio for exhibition. We also use real items, so that if I am teaching on package design for instance, I go to class with actual package of some products like biscuit, soap, and the like to make the explanation and practical activity easier (personal communication, September 15, 2022).

Teacher 6 noted that “sometimes I use video on my smartphone for teaching topics such as sericulture which cannot be understood by just word of mouth” (personal communication, September 9, 2022).

Teachers response indicates the use of is previous artworks kept in portfolio, actual package of manufactured products, charts, pictographs, realia and some videos downloaded on mobile phone as visual aids mostly deployed in teaching.

Visual aids necessary for teaching but not readily available

With regards to visual aids which are necessary for teaching but not readily available for use by teachers in the Senior High Schools, the results indicated course-related equipment such as looms, potter’s wheel as well as video tutorials, computers, projectors and art studios.

Teacher 1:

Videos tutorials are necessary for art lessons. “Seeing is believing”. Some topics has to do with procedure and very mechanical in nature; screen printing, lithography printing – how press operates, and other such technical topics. How do you teach on press operation by just word of mouth? Video presentation is the best but we don’t have projectors and computers. Watching by itself brings understanding before you explain. But we lack so we somehow teach and whether the students understand or not, we leave it like that (personal communication, September 15, 2022).

Teacher 2:

Every Visual Arts class needs an art studio. When images are projected to students, I believe will sustain students interest and incite them to practice on their own (personal communication, August 10, 2022).

Teacher 6:

Video is good when the real objects are not available to show. Loom is of essence for textile students but when it is not there, pictures and videos on the loom can help a lot. It boils down to the computer and projector thing (personal communication, September 9, 2022).

The responses obtained generally gave the indication that a virtual museum through the use of computer and projector would impact on academic performance. This opinion attests to Mtana’s (2014) assertion that the quality of education is enhanced by the availability of relevant teaching visual learning aids.

Incorporating visual learning aids in professional development programmes

When asked whether the respondents have attended any professional development programme – refresher course or in-service training solely on visual aids or instructional resources, the respondents unanimously confirmed not attending any such programme citing that none had been organized to that effect to the best of their knowledge. This gave the indication that even though visual aids are considered to be important or useful for teaching and learning, the concept is not approved for professional development programmes.

Teacher 3 stated that “I can’t recall attending any programme on TLMs. It would not be bad at all having a refresher course on visual aids; it will help a lot” (personal communication, August 10, 2022).

Teacher 1 responded that “I don’t remember any in-service training organized for Art teachers. Probably, the current National Teaching Council (NTC) professional development programme will cater for that” (personal communication, September 15, 2022).

Teacher 5 emphasized that “what better professional development than providing Art teachers with computers and projectors to produce or download videos and pictures that will support the lessons” (personal communication, September 9, 2022).

Suggestions for improvement on visual aids

The results highlights field trips or finding a way to bring what is outside the classroom into the classroom, the need for computers, projectors and internet access in addition to encouraging innovativeness and resourcefulness among art teachers.

Teacher 2 proposed that “excursion to places where these things are is ideal but costly. That is why we prefer to bring the pictures into the classroom in order to avoid travelling long distances that might cause problems or distract instructional time” (personal communication, August 10, 2022).

Teacher 3 shared the view that “stakeholders should not only give attention to ‘Science and Maths’; they should be prompted that Visual Arts teachers do a lot of demonstrations and practicals but lack the materials and machinery” (personal communication, August 10, 2022).

Teacher 1:

The right materials should be made available – computers, projectors and the internet. That would complement the normal teaching which we do by words. Also, when teachers are remunerated well, it will affect the time they spend on mobilizing teaching and learning resources for effective teaching (personal communication, September 15, 2022).

Teacher 4 offered that “Use of technology is the way to go. The traditional way of preparing TLMs through improvisation should be a thing of the past. The generation of students today are digitally inclined and must be assisted as such” (personal communication, September 15, 2022).

Teacher 5:

As art teachers, we have to be innovative to meet the needs of our students. The absence of materials, to me, is an opportunity to be resourceful. However, the art department when well-resourced to production capacity can be a hub for producing and supplying visual aids to schools as a source of revenue generation (personal communication, September 9, 2022).

Teacher 6:

Lesson introduction is a decisive part of teaching and learning. If you observe, at the beginning of lessons, most students struggle to understand the teacher but immediately a picture or video is introduced, then their response changes. That is evidence that visual aids should support all kinds of topics (personal communication, September 9, 2022).

The interview seeks to solicit suggestions to improve on current condition of service. These suggestions necessitate the provision and positioning of instructional materials such that it is readily accessible to teachers and students.

4.3 Assessing Visual Aids Uptake and its Efficacy to Students Learning

Further investigation to ascertain the use of graphic images in lesson delivery was conducted through direct observation of six (6) teachers; two (2) from each sampled school. The observation was expressly carried out with a well-developed observation checklist.

The observation revealed that teachers solely depended on the whiteboard in teaching despite visualization-based instruction was employed in planning of the lesson – hindering teachers’ output and students’ retention. While the objective of the study sought the contributions of visual aids towards academic performance of students, fallout from the observation revealed insignificant uptake of the essential aids for varied reasons. The percentage of teachers who employed some visuals in their teaching satisfied the motivation in students to learn which was evident in students’ contributing to the lesson and eagerness to practice as shown in Table 2 and Figure 1 below:

Table 2: Monitored Usage of Visual Aids in Teaching in Senior High Schools Visited

<i>Schools</i>	<i>Teachers used visual aid(s)</i>	<i>Teachers used whiteboard only</i>	<i>Total</i>
Archbishop Porter’s Girls SHS	1	1	2
St. John’s SHS	1	1	2
Fijai SHS	0	2	2
<i>Total</i>	2	4	6

Source: Field Survey, 2022

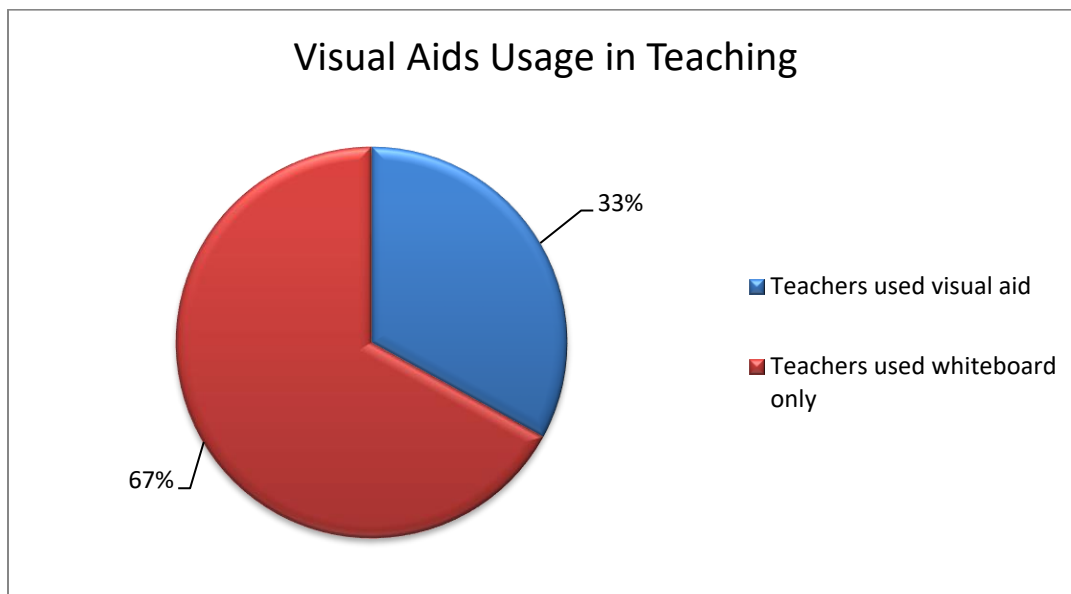


Figure 1

From the *table*, 4 teachers out of 6 did not utilize any teaching aid in their lesson; they depended solely on the whiteboard.

During a post-observation discussion with *Teacher 5* to ascertain why visual aids were not used in teaching, the response was “management is not responsive. They keep saying, ‘no money’. Sometimes, I try to create my own visual aid or purchase it but I can’t continue to do this always for lack of funds” (personal communication, September 28, 2022).

Teacher 4:

I have been teaching this subject for ten years now. I have knowledge and experience in the subject. Though, that is not enough excuse, what can you do when the visual aid you need to use is not available? Management is aware of the lack in the department (personal communication, September 22, 2022).

Teacher 3:

It is not intentional to ignore the use of teaching aids. Those available are not suitable for all topics. I think if we get new visual aids, teachers will be motivated to stop depending solely on the whiteboard. I sometimes sketch on the whiteboard but that takes some time and it is not detailed enough and after the lesson, it is cleaned from the board (personal communication, August 18, 2022).

It is worrying to note that most teachers are getting used to the idea of not using visual aids because they are not handy. Although teachers showed general awareness of the undisputed place of graphic images, unavailability of the aids heightened total dependency on the whiteboard.

CONCLUSION

The study concludes that the impact of visual aids on teaching and learning establishes a direct correlation between visual aids use and effective students' academic performance thereby promoting creativity among student, deeper understanding and easy approach in pedagogy.

The study further concludes that effective visual aids requires positioning of visual aids such that they are readily accessible or handy to teachers capable to use and students willing to learn in the quest to providing immediate physical evidence and comprehension that brings the topic closer to students than abstract.

Although the significance of supporting visuals in teaching is well-known, the study again concludes that its uptake lacks the urgency it deserves which calls for concern.

RECOMMENDATIONS

1. To achieve the overall academic performance, the study recommends that Visual Arts learning should be adequately supported with visual aids.
2. Visual Arts teachers should be given periodic training on visual aids usage and updated on new trends in visual aids in order to ensure that their ability to effectively use these resources for teaching is enhanced.
3. The study endorses incorporating different kinds of visual aids to support learned topics.

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