

**ENHANCING COLOUR SELECTION AND APPLICATION IN GRAPHICS DESIGN
AMONG A-LEVEL STUDENTS AT MBOGO HIGH SCHOOL, KAMPALA**

**AHEEBWA ROGERS
17/U/14292/GMVP/PE**

**A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND
GRADUATE TRAINING IN FULFILMENT OF THE REQUIREMENT FOR
THE AWARD OF DEGREE OF MASTER OF VOCATIONAL
PEDAGOGY OF KYAMBOGO UNIVERSITY**

OCTOBER, 2025

DECLARATION

I, **AHEEBWA ROGERS**, do hereby declare that this research dissertation is my original piece of work and has never been presented to any institution of higher learning or for the award of any degree.

Signature

AHEEBWA ROGERS
17/U/14292/GMVP/PE

Date

APPROVAL

This is to acknowledge that this action research report work titled “*Enhancing colour selection and Application in Graphics Design among A-level Students at Mbogo HIGH School, Kampala*” has been under our supervision and is ready for submission to Kyambogo University Graduate School with our approval.

Signed:

Dr. Wycliff Edwin Tusiime (PhD)

(Principal Supervisor)

Date.....

Signed:

Dr. Patrick Serunjogi (PhD)

(Second Supervisor)

Date.....

DEDICATION

The work of my hands is dedicated to my beloved parents; Mr. Kasaija Joachim, Night Beatrix and brothers and sisters; Asiimwe Robert, Kisakye Innocent, Nasonzi Patience and Kugonza Winnie. Thank you for loving and being tolerant with me when I often had difficulties and could not give you all the due attention and care you deserved.

Your contribution will remain memorable to me may God bless them abundantly!

ACKNOWLEDGEMENTS

I hereby extend my heartfelt thanks to Norwegian Management through the NORHED Program for sponsoring students from Uganda; this offer has made it possible for me to undertake this Vocational Pedagogy at Kyambogo University.

I am grateful to my supervisors; Dr. **Wycliffe Edwin Tusiime (PhD)** and Dr. **Patrick Serunjogi (PhD)**, for their dedicated effort, encouragement and academic guidance while undertaking this thesis writing. I also indebted to Hon. Wathum Edwin for overseeing corrections made in this research.

TABLE OF CONTENTS

DECLARATION.....	ii
APPROVAL	iii
DEDICATION.....	iv
ACKNOWLEDGEMENTS	v
LIST OF FIGURES	xi
LIST OF TABLES	xii
LIST OF ACRONYMS	xiii
CHAPTER ONE	1
INTRODUCTION.....	1
1.0 Introduction.....	1
1.1 Background of the Study	1
1.1.1 Importance of Graphic Design.....	1
1.1.2 Vocational Education and Training (VET) Context	1
1.1.3 Graphics Education in Uganda	2
1.1.4 Situation at Mbogo High School.....	2
1.1.5 Situation Analysis	3
1.1.6 Future Workshop	3
1.2 Statement of the Problem.....	7
1.3 Purpose of the Study	8

1.4 Specific Objectives	8
1.5 Research Questions	8
1.6 Justification of the Study	9
1.7 Significance of the Study	9
1.8 Scope of the Study	9
1.9 Limitations of the Study.....	10
1.10 Definition of Key Terms	11
CHAPTER TWO	12
LITERATURE REVIEW	12
2.0 Introduction.....	12
2.1 Theoretical Framework.....	12
2.2 Principles of Colour Applied in Graphic Design (Objective 1).....	13
2.3 Learning Activities That Promote Colour Conceptualisation (Objective 2)	14
2.2.1 Mind Mapping and Colour Wheels.....	16
2.2.2 Iterative Project-Based Activities	16
2.2.3 ICT Integration.....	16
2.2.4 Collaborative Critique Sessions	16
2.3 Evaluating Graphic Design Layouts Linked to Colour Conceptualisation (Objective 3) ..	17
2.4 Integration of Traditional and Modern Graphic Design Methods	17
2.5 Gaps in the Literature.....	17

2.6 Summary	18
CHAPTER THREE	18
METHODOLOGY	18
3.0 Introduction.....	18
3.1 Study Design.....	19
3.1.1 Participatory Action Research (PAR).....	19
3.2 Study Area	20
3.3 Study Population.....	20
3.4 Sample Size.....	21
3.5 Sampling Techniques.....	21
3.6 Instruments.....	21
3.6.1 Methods of Data Collection.....	21
3.6.2 Tools of Data Collection.....	21
3.7 Procedure of Data Collection.....	23
3.7.1 Identifying and Analyzing Colour Principles	23
3.7.2 Designing and Implementing Learning Activities.....	24
3.7.3 Evaluating Student Layouts	24
3.7.4 Recording and Managing Data	25
3.8 Data Analysis.....	25
3.9 Validity and Reliability (Trustworthiness)	25

3.9.1 Validity	25
3.9.2 Reliability	26
3.10 Ethical Considerations	27
3.11 Summary	28
CHAPTER FOUR.....	29
PRESENTATION AND DISCUSSION OF RESULTS	29
4.0 Introduction.....	29
4.1 Objective 1: Identifying and Analysing Principles of Colour Applied in Graphic Design	29
4.1.1 Hero Colour Selection.....	30
4.1.2 Colour Combinations and Relationships	30
4.2 Objective 2: Designing and Implementing Learning Activities That Promote Colour	
Conceptualization	32
4.2.1 Learning Activities Implemented	32
4.2.2 Evidence of Learning.....	32
4.3 Objective 3: Evaluating Student Graphic Design Layouts to Determine Mastery of Colour	
Application.....	34
4.3.1 Performance Results	34
4.3.2 Evaluation of Final Projects.....	35
4.4 Summary	39
CHAPTER FIVE	40

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	40
5.1 Summary	40
5.2 Conclusions.....	40
5.3 Discussion.....	42
5.4 Recommendations.....	43
REFERENCES	44

LIST OF FIGURES

Figure 1: Students brainstorming on challenges	4
Figure 2: Researcher records points.....	5
Figure 3: PAR cycle illustrating planning, action, observation, and reflection.	20
Figure 4: Understanding primary, secondary, and tertiary colour relationships.....	31
Figure 5: Students applying colour combinations and tints during guided practice.	33
Figure 6: The researcher evaluates the students' projects/ layouts that are linked to colour conceptualization	37
Figure 7: Students selecting and applying their hello colours in the work.	38

LIST OF TABLES

Table 1.1: Number of candidates enrolled for Graphics (2016–2018)	3
Table 1.2: Performance (%) of Candidates in Graphics Paper 3 compared to other disciplines	3
Table1.3: Major Causes of Poor Performance in Graphics	6
Table 1.4: Ranking the challenges using pair wise matrix	6
Table 4.1: Students’ Performance Before and After Intervention.....	34

LIST OF ACRONYMS

FGD:	Focus Group Discussion
MHS:	Mbogo High School
MoES:	Ministry of Education and Sports
MVP:	Masters of Vocational Pedagogy
TVET:	Technical Vocational Education and Training
UNCDC:	Uganda National Curriculum Development Centre
UNESCO:	United Nations Education, Science and Cultural Organization
VET:	Vocational Education and Training
VTI:	Vocational Training Institution

LIST OF APPENDICES

Appendix A. Causes of Poor Performance in Graphics

Appendix B. The challenges using pair wise matrix

Appendix C. Implementation Plan

Appendix D: Students' Performance Scores Before and After the Colour Learning

Intervention

Appendix E. Introduction Letter to seeking permission to hold the Futures Workshop meeting

ABSTRACT

The purpose of this study was to improve students' performance in graphic design through enhanced skills in colour selection and use at Mbogo High School in Kampala, Uganda. The specific objectives were: (i) to identify and analyze the principles of colour applied in graphic design, (ii) to design learning activities that promote colour conceptualisation, and (iii) to evaluate graphic design layouts produced that are linked to colour conceptualisation. A participatory action research design was adopted, combining descriptive methods with collaborative inquiry. Data were collected from 30 A-Level Art students and 2 Art teachers using focus group discussions, classroom observations, and document analysis. A pairwise matrix within a Future Workshop framework was used to prioritise challenges affecting students' colour use. The findings revealed that students had limited skills in colour selection, and teachers struggled with inadequate instructional strategies and limited experience. After the intervention, 80% of students demonstrated improved ability in colour selection, while teachers' confidence and instructional competence increased by 30%. Student engagement and project completion rates rose by 25%, with noticeable improvements in colour harmony, contrast, and overall layout quality in graphic design tasks. The study recommends adopting structured, learner-centred teaching approaches, continuous professional development for art teachers, and provision of adequate instructional materials. These strategies can strengthen students' colour conceptualisation skills, enhance performance in graphic design, and prepare learners for future creative and professional opportunities.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter introduces the study and provides the context within which it was conducted. It presents the background of the study, situation analysis, statement of the problem, purpose, specific objectives, research questions, scope, justification, significance, limitations, and definition of key terms.

1.1 Background of the Study

1.1.1 Importance of Graphic Design

Graphic design is a vital field within the visual arts and creative industries, concerned with the effective combination of text, images, and other visual elements to communicate messages. It plays a central role in advertising, branding, packaging, and digital media, making it an essential skill for communication in today's visual culture (Baker, 2014). Well-designed graphics influence consumer decisions, build brand identity, and shape how information is understood.

For students, learning graphic design provides opportunities to express ideas creatively, develop problem-solving skills, and acquire competencies valuable for employment or entrepreneurship. In Uganda, where youth unemployment is high, graphic design can provide a pathway for self-sustenance through freelancing, digital design services, and small-scale business ventures.

1.1.2 Vocational Education and Training (VET) Context

Technical and Vocational Education and Training (TVET) is a key component of Uganda's education system, designed to equip learners with employable knowledge, practical skills, and attitudes for the world of work. Jailani and Faizal (2017) note that TVET aims to produce graduates who are competent, productive, and ready for industrial and entrepreneurial opportunities.

Vocational pedagogy emphasises “learning by doing,” engaging learners actively in projects, hands-on exercises, and problem-solving tasks. Lucas, Spencer, and Claxton (2012) describe it as the integration of head, hand, and heart—combining theory, practice, and values to prepare

individuals for meaningful work. Learner-centered approaches foster participation, creativity, and independence.

Graphic design education falls under this framework, developing technical skills such as layout design, colour mixing, and typography while nurturing critical thinking and innovation. However, outcomes depend on effective teaching strategies, adequate resources, and teacher guidance. Where these are lacking, learners may fail to acquire competencies required for employment or further study.

1.1.3 Graphics Education in Uganda

Graphics is examined by the Uganda National Examinations Board (UNEB) as part of Fine Art at both O-Level and A-Level. The syllabus requires competence in lettering, illustration, colour application, and composition. Performance in graphics therefore influences overall Fine Art grades.

Despite its importance, many schools face challenges in teaching graphics effectively. These include limited time for practical lessons, inadequate instructional materials, and reliance on teacher-centered methods that reduce learner participation. Consequently, students often graduate without mastering essential skills, limiting their competitiveness in the job market or readiness for higher education in design-related fields.

1.1.4 Situation at Mbogo High School

Mbogo High School, a girls' secondary school in Kawempe–Ttula, Kampala District, offers O-Level and A-Level education. The school is registered with the Ministry of Education and Sports (Registration No. PSS/M/65) and has over 1,200 students.

Although the school has qualified art teachers and tools for teaching graphic design, student performance has remained unsatisfactory. UNEB records from 2016 to 2018 indicate a downward trend in Paper 3 (Graphics), as shown in Tables 1 and 2:

Table 1.1: Number of candidates enrolled for Graphics (2016–2018)

YEAR	2016	2017	2018
Number Of Students	25	28	30

Source: Primary data

Table 1.2: Performance (%) of Candidates in Graphics Paper 3 compared to other disciplines

Discipline	YEAR		
	2016	2017	2018
Graphics	20.7	20.4	19.8
Others	79.3	79.6	80.2

Source: UNEB (2019)

This data shows that graphics consistently records weak results compared to other Fine Art disciplines. This persistent underperformance motivated the researcher, who teaches at Mbogo High School, to investigate the causes and design interventions to address them.

1.1.5 Situation Analysis

An analysis was conducted to identify gaps in teaching and learning. Factors contributing to poor performance included weak colour selection, inadequate illustration skills, poor layout construction, and limited exposure to real-life design applications. These findings informed the design of a Future Workshop (FW) to collaboratively find solutions.

1.1.6 Future Workshop

Following Jungk's (1987) model, a Future Workshop was held on 27 February 2019 in the Foods and Nutrition Department of Mbogo High School, with thirty students and two teachers participating. The workshop followed preparation, critique, clustering, fantasy, and reality phases as shown in figure 1 and figure 2.



Figure 1: Students brainstorming on challenges

Source: Primary Data



Figure 2: Researcher records points

Source: Primary Data

During the critique phase, participants identified several causes of poor performance (Table 3). Using a pairwise ranking matrix, poor colour selection was identified as the most pressing challenge.

Table1.3: Major Causes of Poor Performance in Graphics

Short Term	Medium Term	Long Term
Poor colour selection Proper illustration Proper layout Teaching updated syllabus Self-drive Poor attitude towards the teacher Inadequate materials and tools Peer Pressure Un favorable Environment Teaching what is not on syllabus	Accuracy of construction of letters Availability of materials and tools Favorable environment Poor measuring terms Inadequate time Poor shading skills Lack of exposure Lack of consultation	Poor management Lack of interest Examination fear Limited skills Teachers favors of some students Lack of passion Limited competition Teacher's character Teachers over Poor thinking capacity Lack of exposure to the seminars Positive attitude towards the teachers

Source: Primary data

Stakeholders agreed to focus on improving colour selection skills as the priority intervention.

Table 1.4: Ranking the challenges using pair wise matrix

PROBLEM	1	2	3	4	TOTAL	RANK
1		1(22)	3(20)	1(16)	5	1st
2			1(20)	1(16)	2	2nd
3				3(19)	3	3rd
4					1	4th

Source: Primary Data

The results presented in Table 1.4 reveal that poor selection of colours emerged as the most significant challenge affecting students' performance in graphic design, garnering the highest total score (5) and ranking first. This indicates a strong agreement among respondents that inadequate colour selection skills hinder students' ability to produce high-quality design work. Poor construction of letters and poor illustration were ranked second and third respectively, while proper layout was identified as the least critical challenge.

Based on these findings, and considering the available time and resources, stakeholders recommended the following strategies to enhance students' performance in graphic design:

Strengthen colour training: Equip students with practical skills in applying tints, shades, and appropriate colour harmonies to create visually appealing designs.

Promote real-life project work: Encourage students to design projects that address real-world scenarios, thereby bridging classroom learning with industry expectations.

Foster creativity and originality: Provide training on project estimation and design processes that emphasize uniqueness, innovation, and creative thinking.

Develop research skills: Guide students to investigate existing graphic design solutions and use their findings to inform and improve their own design projects.

1.2 Statement of the Problem

Graphic design is an essential component of Fine Art education that fosters creativity, innovation, and employable skills among learners. However, at Mbogo High School, A-Level students have consistently exhibited weak performance in graphic design, particularly in colour selection and application. Analysis of Uganda National Examinations Board (UNEBC) results between 2016 and 2018 revealed that students scored below 25% in Graphics Paper 3, showing a persistent decline compared to other Fine Art components. This indicates a major instructional gap in students' mastery of colour principles, composition, and design execution. The problem is compounded by limited practical exposure, inadequate learning materials, and teacher-centered instructional methods that restrict learner creativity. Consequently, many students fail to develop the competencies required for professional practice or further design education. At a national level, such performance undermines the objectives of Technical and Vocational Education and Training

(TVET), which seeks to produce creative and skilled graduates capable of contributing to Uganda's growing visual and creative economy.

1.3 Purpose of the Study

The purpose of this study was to enhance A-Level students' performance in graphic design by improving their ability to select and apply colours effectively through problem-based learning activities.

1.4 Specific Objectives

The Objectives of the study were to;-

1. Identify and analyse the principles of colour applied in graphic design, establishing a foundation for designing effective learning activities that enhance students' conceptual understanding.
2. Design and implement learning activities that promote colour conceptualisation, with a focus on student engagement and problem-based learning strategies.
3. To evaluate graphic design layouts produced by students, determining the extent to which they reflect mastery of colour selection and conceptualisation.

1.5 Research Questions

1. What principles of colour are applied and how are they analysed in the context of graphic design?
2. How can problem-based learning activities be designed and implemented to promote students' colour conceptualisation?
3. To what extent do students' graphic design layouts demonstrate improved mastery of colour selection and application?

1.6 Justification of the Study

Colour is fundamental in graphic design and significantly influences the visual appeal of students' work. Strengthening students' understanding of colour principles improves their ability to create harmonious and effective compositions, leading to better academic performance and enhanced employability skills.

1.7 Significance of the Study

Students: Improve practical skills and foster positive attitudes toward graphic design. This will enable them to express ideas more creatively and confidently in both classroom projects and national examinations.

Teachers: Gain structured approaches for teaching colour selection, enhancing pedagogical competence. This will help them to deliver lessons more effectively and to cater for learners with different abilities and learning styles.

School: Benefit from improved academic performance and a strengthened reputation in Fine Art. This may attract more students interested in pursuing art-related subjects and contribute to the school's overall academic excellence.

Researchers and Curriculum Developers: Contribute to knowledge on vocational pedagogy and learner-centered strategies for graphic design. The findings may also inform future curriculum reviews and inspire further studies aimed at improving art education in secondary schools.

1.8 Scope of the Study

The study was conducted at Mbogo High School in Kawempe–Ttula, Kampala District, focusing on A-Level Fine Art students offering Graphics. It specifically addressed poor performance in colour selection and application in Graphic Design.

The content scope covered colour principles, design composition, and project-based learning activities that enhance conceptual understanding. The geographical scope was limited to Mbogo High School due to accessibility and identified performance issues. The time scope covered the 2019 academic year, during which the Future Workshop and learning interventions were implemented. The theoretical scope was anchored in vocational pedagogy and problem-based

learning theories, emphasizing participatory, learner-centered approaches to practical skill development.

1.9 Limitations of the Study

While this study was carefully designed and implemented, several limitations were encountered that may influence the interpretation and generalisability of the findings:

Scope Limitation: The study focused only on A-Level students at Mbogo High School and colour conceptualisation; findings may not be fully generalisable to other schools or levels.

Future studies could expand to include different schools or educational levels to enhance the applicability of the results.

Sample Size: Thirty students and two teachers participated; a larger sample could provide more robust generalisations.

Increasing the number of participants in future research could yield more reliable statistical and qualitative insights.

Time Constraints: Conducted over one school term; longer interventions might yield more in-depth outcomes.

Extending the study duration would allow for more consistent monitoring of student progress and sustained behavioural change.

Resource Limitations: Availability of teaching materials, colour tools, and printing facilities was limited, potentially affecting student outputs.

Improved access to adequate learning materials and digital tools could enhance both instructional delivery and students' creative expression.

External Influences: Student performance could have been influenced by factors outside the study, such as home environment, prior knowledge, and motivation, which were not directly controlled.

Future research should consider incorporating measures to account for these external factors to better isolate the effect of the intervention.

1.10 Definition of Key Terms

Colour Conceptualization: The ability to understand, interpret, and apply colour principles in graphic design, including hue, value, intensity, and harmony, to produce visually effective designs.

Graphic Design: A creative process that combines text, images, and other visual elements to communicate messages effectively through various media, including print, digital, and advertising platforms.

Problem-Based Learning (PBL): A learner-centered teaching strategy in which students engage in solving real-world problems, promoting active learning, critical thinking, and practical application of theoretical knowledge.

Learning Activities: Structured tasks or exercises designed to facilitate knowledge acquisition, skill development, and conceptual understanding in students.

Performance: The level of competence demonstrated by students in completing graphic design projects, measured through colour application, layout design, and overall quality.

Future Workshop (FW): A participatory research and problem-solving method, developed by Jungk (1987), used to identify challenges and collaboratively design interventions.

A-Level Students: Students enrolled in the final two years of secondary education in Uganda, preparing for the Uganda Advanced Certificate of Education (UACE).

Vocational Pedagogy: A teaching approach integrating theory, practice, and values to equip learners with practical skills and competencies for work or entrepreneurship.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature on enhancing A-Level students' understanding and application of colour in graphic design. The review is structured around the revised study objectives: (1) identifying and analysing principles of colour applied in graphic design, (2) designing and implementing learning activities that promote colour conceptualisation, and (3) evaluating student graphic design layouts to determine mastery of colour application. The chapter integrates both international and local perspectives, considers traditional and modern digital approaches, and identifies gaps relevant to A-Level practice in Uganda.

2.1 Theoretical Framework

This study is guided by Action Research Theory (Lewin, 1946; McNiff & Whitehead, 2011), which emphasises participatory problem solving, reflection, and iterative improvement in educational practice. Teachers and learners act as co-researchers, identifying challenges, experimenting with interventions, and evaluating outcomes.

The Future Workshop Model (Jungk & Müllert, 1987) operationalizes action research in this study through three phases:

Critique Phase – Reflection on challenges in colour application.

Fantasy Phase – Collaborative envisioning of ideal learning scenarios.

Implementation Phase – Designing, testing, and refining solutions.

This model aligns with constructivist learning theory, which asserts that learners build knowledge actively through experience, reflection, and collaboration (Bruner, 1996; Fosnot, 2013). It is further reinforced by Kolb's Experiential Learning Cycle (1984), which provides a structure for students to explore, reflect, conceptualise, and experiment with colour in design projects.

Together, action research, the Future Workshop model, and constructivist learning provide a robust theoretical framework for enhancing colour conceptualisation at A-Level. This integrated approach supports the study's objectives by guiding reflective identification of colour principles, structuring participatory learning activities, and informing iterative evaluation of student work. It also resonates with Uganda's CBC priorities of creativity, problem solving, and reflective practice (NCDC, 2020, 2022).

2.2 Principles of Colour Applied in Graphic Design (Objective 1)

According to Mehl (2019), colour theory provides designers with practical tools for effective visual communication. She emphasises that experimenting with colour can enhance creativity and guide the design process. Using a colour theory model, Mehl identifies three fundamental principles of colour that are essential for designers, as illustrated in Figure 3 below.

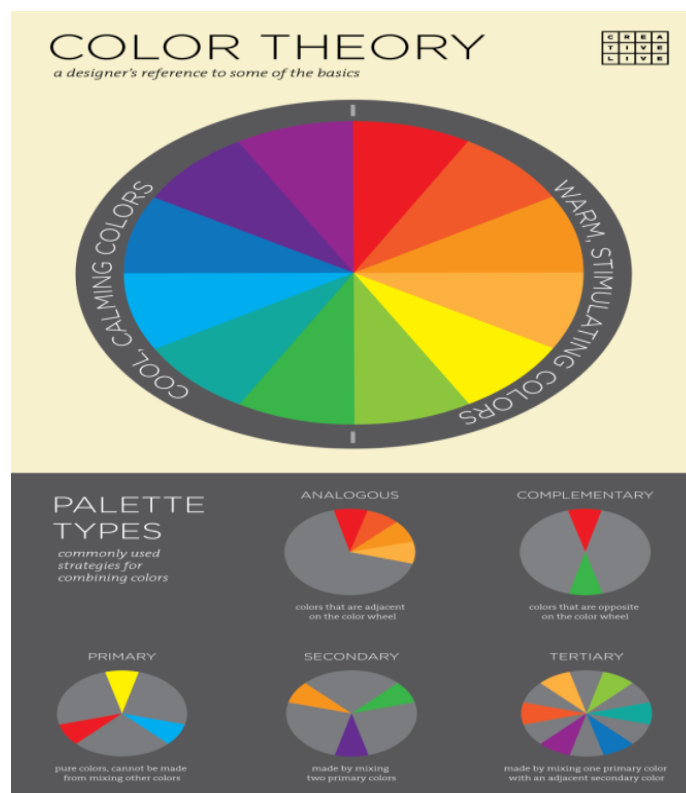


Figure 3: presents a colour scheme displaying various types of colours.

Source: Mehl (2019)

In visual communication, colour scheme refers to a group of colours that work together in harmony to convey a specific mood or message, whether loud, quiet, light, heavy, warm, cool, or conventional. In most graphic design projects, such as branding, the palette is typically built around a dominant "hero colour." This hero colour is often complemented by two or more supporting colours, though some brands may choose to work with two hero colours. When selecting these key colours, it is crucial to understand how certain colours harmonize better than others (Mehl, 2019).

Colour is a critical element of visual communication, influencing perception, emotion, and message delivery (Mehl, 2019; Itten, 1970). Understanding and analyzing colour principles enables designers to create effective and aesthetically pleasing compositions. Key principles include:

Hero Colour Selection – The main colour communicates the core idea (e.g., blue for calmness, red for energy), with adjustments in tone, saturation, and temperature to create nuance (Mehl, 2019).

Colour Combinations – Supporting colours can reinforce unity through analogous or monochromatic schemes or create contrast via complementary pairings (Itten, 1970; Mehl, 2019).

Colour Relationships – Awareness of primary, secondary, and tertiary colours ensures harmonious palettes; complementary pairings such as red–green or blue–orange create dynamic effects (Itten, 1970).

Digital tools have expanded the application of traditional colour theory. Software such as Adobe Illustrator, Photoshop, and Kuler allows rapid testing of colour harmony, experimentation with palettes, and real-time feedback, bridging traditional methods with modern digital design processes (Kumi et al., 2012). Within Uganda's CBC framework, these principles are embedded in competencies such as "selecting and justifying colour schemes appropriate to design briefs" (NCDC, 2022).

2.3 Learning Activities That Promote Colour Conceptualisation (Objective 2)

Drawing on experiential learning theory commonly described as "learning by doing" Burgess (2015) explains how Kolb's stages can be interpreted as activities that support the learning process. Rather than ending after a single cycle, these stages form a continuous, spiraling process. While

Kolb's model may appear to oversimplify learning by implying a fixed sequence that learners do not always follow, it remains a valuable tool for designing learning experiences. The key is to view it as a flexible framework rather than a rigid prescription.

Experience	Reflection	Conceptualisation	Experimentation
Make	Crit/discuss	Review	Revise
Visit	Discuss	Interpret	Relate to own work
Explore material	Observe	Categories properties	Apply

Figure 3.4.2 Application of Kolb learning cycle to art and design

Source: Researcher's illustration adapted from Kolb (1984).

Kolb's Experiential Learning Cycle consists of four interconnected stages that represent how individuals learn from experience (Kolb, 1984):

Concrete Experience (CE):

This is the stage where learners actively engage in an experience. It could be a practical task, an activity, or a real-life situation that allows them to gain first-hand involvement.

Reflective Observation (RO):

After the experience, learners step back to reflect on what happened. They observe and consider the experience from different perspectives, thinking critically about outcomes, challenges, and feelings.

Abstract Conceptualization (AC):

In this stage, learners make sense of their reflections by forming concepts, theories, or generalisations. They connect the experience to existing knowledge or create new ideas to explain what they have observed.

Active Experimentation (AE):

Learners apply the new concepts or insights to plan and try out different approaches in future situations. This leads to new experiences, beginning the cycle again.

Learning activities that promote colour conceptualisation integrate student-centered, experiential, and technology-enhanced approaches, consistent with constructivist learning theories (Kolb, 1984; Bruner, 1996; Fosnot, 2013).

2.2.1 Mind Mapping and Colour Wheels

Mind maps help students connect emotional responses to colour choices, while colour wheels facilitate experimentation with analogous, complementary, and monochromatic schemes (Zhejiang University, 2017).

2.2.2 Iterative Project-Based Activities

Engaging students in authentic design projects, such as branding, poster campaigns, or packaging, encourage iterative design, critique, and refinement of colour palettes. This approach fosters problem-solving, creativity, and persistence (Bell, 2010).

2.2.3 ICT Integration

Digital tools such as Adobe Kuler, Photoshop, and Canva enable students to manipulate hue, saturation, and contrast, supporting both technical and conceptual understanding (Kumi et al., 2012; Mehl, 2019). Hybrid learning, combining digital and traditional methods, enriches colour exploration.

2.2.4 Collaborative Critique Sessions

Peer feedback and collaborative reflection help students articulate design decisions, refine colour choices, and develop a shared design vocabulary (Kaput, 2018; Saragih & Napitupulu, 2015). This aligns with CBC competencies in creativity, problem-solving, and effective communication (NCDC, 2020).

2.3 Evaluating Graphic Design Layouts Linked to Colour Conceptualisation (Objective 3)

Assessment of student work should triangulate evidence from final products, process observations, and learner dialogue (NCDC, 2022). Key evaluation criteria include:

Design Principles – Contrast, alignment, repetition, and proximity (Williams, 2008).

Colour Effectiveness – Mood, readability, hierarchy, and emphasis.

Message Clarity – Whether colour reinforces the central idea or focal point.

Typography and Imagery – Integration of colour with typefaces and visuals.

Audience Relevance – Appropriateness of palette to user needs and design objectives.

Triangulated assessment ensures validity and captures the depth of students' understanding of colour conceptualization.

2.4 Integration of Traditional and Modern Graphic Design Methods

Blending traditional methods (hand sketches, colour mixing, palette creation) with digital technologies (illustration software, colour simulation tools) enhances creativity, efficiency, and conceptual understanding of colour (Lucas, Spencer, & Claxton, 2012; Kumi et al., 2012). This integration supports CBC's emphasis on competency, problem-solving, and reflective learning.

2.5 Gaps in the Literature

Despite extensive studies on colour principles, learning activities, and assessment strategies, several gaps remain:

Limited empirical research in Uganda on CBC's impact on A-Level graphic design.

Insufficient data on teacher preparedness for delivering colour conceptualisation effectively.

Few locally adapted assessment frameworks aligned with CBC standards.

Limited exploration of integrating modern digital technologies with traditional methods.

This study addresses these gaps by investigating CBC-aligned learning activities and assessment strategies to enhance colour conceptualisation at A-Level.

2.6 Summary

The literature review establishes that:

Principles of colour, we have here colour selection, colour combinations, and colour relationships are central to effective graphic design.

Student-centered, experiential, and project-based activities, enhanced by digital technologies, promote colour conceptualisation.

Assessment of graphic design layouts should triangulate product, process, and dialogue to provide comprehensive evidence of learning.

By structuring the review explicitly around the three revised study objectives, this chapter situates the study within both international and Ugandan contexts, highlights the relevance of modern technologies, and identifies critical gaps for investigation.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology used to investigate strategies for improving A-Level students' colour conceptualisation and performance in graphic design at Mbogo High School,

Kampala. It describes the research design, population, sampling procedures, data collection instruments, research procedures, data analysis, and ethical considerations.

The study is anchored in the Competency-Based Curriculum (CBC) framework, which emphasises active learning, creativity, problem-solving, and development of practical skills (National Curriculum Development Centre [NCDC], 2020). The methodology also draws on Kolb's Experiential Learning Model, supporting learning through cycles of experience, reflection, conceptualisation, and experimentation (Kolb, 1984).

The methodology was guided by the revised study objectives:

1. To identify and analyse the principles of colour applied in graphic design.
2. To design and implement learning activities that promote colour conceptualisation.
3. To evaluate student graphic design layouts to determine mastery of colour application.

3.1 Study Design

A Participatory Action Research (PAR) design was adopted for this study. PAR is suitable for educational research because it combines inquiry with practice, allowing teachers and learners to collaborate in cycles of planning, acting, observing, and reflecting (Kemmis & McTaggart, 2005). This iterative process enabled testing and refining of teaching strategies in real classroom settings while ensuring alignment with CBC's student-centered and competency-driven approach (Creswell, 2014).

3.1.1 Participatory Action Research (PAR)

PAR emphasises collaboration between the researcher and participants. Both parties jointly identify challenges, develop strategies, collect and analyse data, and evaluate outcomes. In this study, students, teachers, and administrators acted as co-researchers, contributing to the design and implementation of interventions aimed at enhancing colour conceptualisation (Beckwith, 2015; Department of Health and Human Services [DHHS], 2012).

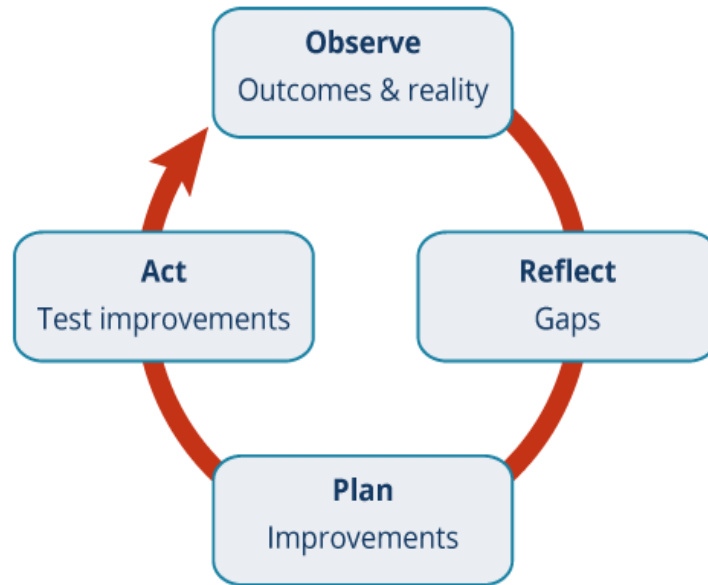


Figure 3: PAR cycle illustrating planning, action, observation, and reflection.

Source: DHHS, 2012.P.8

3.2 Study Area

The study was conducted at Mbogo High School, located in Kawempe–Ttula, Kampala District, Uganda. The school is a private girls’ secondary institution offering both O-Level and A-Level education. It was purposively selected because it offers Fine Art at A-Level and had registered consistent poor performance in Graphic Design Paper 3. The researcher’s familiarity with the school setting provided access and rapport necessary for effective participatory engagement and data collection.

3.3 Study Population

The study population included four categories of participants:

32 Senior Six students actively engaged in graphic design coursework.

2 Art teachers facilitating practical lessons.

The Head Teacher, providing administrative approval and oversight.

The Dean of Studies, coordinating curriculum alignment and academic consistency.

Including these participants ensured diverse perspectives on learning activities, CBC implementation, and student outcomes (NCDC, 2022).

3.4 Sample Size

The study involved thirty-two (32) A-Level Fine Art students and two (2) teachers from the Art and Design department. This sample size was adequate for a qualitative participatory study because it allowed close interaction, observation, and collaboration during the action research cycles.

3.5 Sampling Techniques

The study employed purposive sampling to select participants who had relevant experience and knowledge regarding colour use in graphic design. Purposive sampling, as noted by Creswell (2014), allows the researcher to select individuals who can provide in-depth and meaningful information related to the research objectives. Both students and teachers were selected based on their engagement in Fine Art and willingness to participate in the action learning process.

3.6 Instruments

3.6.1 Methods of Data Collection

The study used qualitative methods including observation, focus group discussions, reflective journals, and interviews. These methods enabled the researcher to capture participants' experiences, attitudes, and reflections throughout the participatory learning process.

3.6.2 Tools of Data Collection

Observation Checklists; Observation checklists were structured tools used to document students' participation, creativity, and practical application of colour principles during class activities and project work.

The researcher systematically observed students during lessons and practical sessions, marking instances of active engagement, adherence to colour theory, experimentation with colour

combinations, and originality in their work. Observations were recorded in real-time to ensure accuracy and reliability.

Observations provided direct evidence of student behaviour and skill application in a natural classroom setting, allowing the researcher to assess not only what students knew but how they applied their knowledge practically. This method helped identify patterns in engagement and creative output that other instruments might not capture.

Focus Group Discussion (FGD) Guides; FGD guides were used to facilitate structured group discussions among students regarding their experiences with the learning activities, challenges faced in colour selection, and overall perceptions of graphic design tasks.

Groups of 6–10 students participated in moderated discussions guided by pre-determined questions. The researcher encouraged interaction and shared reflection while recording responses through note-taking and audio recordings for subsequent analysis.

FGDs allowed the researcher to explore students' collective experiences and perspectives, revealing insights into social and cognitive processes that influence learning in graphic design. The method also provided a platform for students to articulate challenges that may not emerge through individual observation or questionnaires.

Reflective Journals; Reflective journals were personal records kept by students to document their learning experiences, insights, and difficulties encountered after each session.

Students were instructed to write daily or weekly reflections on activities, specifically noting challenges with colour selection, new techniques learned, and personal strategies for improvement. The journals were reviewed by the researcher to extract qualitative data on learning progression.

Reflective journaling encouraged self-assessment and metacognition, allowing students to internalise learning experiences. It also provided the researcher with rich, individualised data on

student perceptions, attitudes, and problem-solving approaches that complemented observational and discussion-based findings.

Interview Guides; Interview guides were used to collect teachers' professional perspectives on the interventions, student engagement, and the impact on students' performance in colour application.

Semi-structured interviews were conducted with teachers individually. Open-ended questions allowed teachers to describe experiences, give examples, and reflect on the effectiveness of the strategies implemented in class. Interviews were audio-recorded and transcribed for thorough qualitative analysis.

Teachers' insights were critical in understanding the broader educational context, verifying student-reported experiences, and providing professional evaluation of students' progress. This perspective strengthened the triangulation of data, increasing the credibility and depth of the study's findings.

Data Triangulation; The combined use of observation checklists, FGDs, reflective journals, and interviews ensured data triangulation, which enhanced the reliability and validity of the findings. By collecting information from multiple sources and methods, the study minimised biases and provided a comprehensive understanding of students' experiences, learning behaviours, and performance in colour application.

3.7 Procedure of Data Collection

The data collection procedure involved systematic steps to gather information on students' colour conceptualisation and performance. Each step is described below according to what was done, how it was done, and why it was done.

3.7.1 Identifying and Analyzing Colour Principles

Introduction of foundational colour concepts, including primary, secondary, and tertiary colours, and analysis of colour principles applied in graphic design.

Workshops and lessons were conducted where students engaged in demonstrations, discussions, and practical exercises on colour selection, mixing, and relationships. Teachers guided students through exercises while the researcher observed and recorded engagement.

To ensure students understood the theoretical and practical aspects of colour, establishing a foundation for subsequent learning activities and interventions aligned with CBC competencies (NCDC, 2020).

3.7.2 Designing and Implementing Learning Activities

Learning activities aimed at enhancing students' colour conceptualisation skills through hands-on projects such as posters, branding exercises, and digital design tasks.

Students worked individually and collaboratively on projects. Teachers facilitated activities, provided feedback, and encouraged reflection at each stage. Administrators supported by ensuring availability of resources and monitoring alignment with CBC objectives.

Practical, problem-based activities allowed students to apply theoretical knowledge, develop creativity, and experience Kolb's experiential learning cycle in action (Kolb, 1984). This approach also reinforced student-centered learning and iterative improvement.

3.7.3 Evaluating Student Layouts

Assessment of students' graphic design outputs, focusing on colour application, creativity, originality, and communication effectiveness.

Triangulated evaluation using teacher feedback, peer reflection, administrator review, and researcher observations. Pre- and post-intervention scores were collected to measure changes in performance.

Evaluation ensured that learning outcomes were systematically measured, confirming whether interventions improved students' understanding and application of colour principles in practical designs. It also provided evidence to refine teaching strategies for future cycles.

3.7.4 Recording and Managing Data

All data from observations, questionnaires, journals, FGDs, interviews, and performance records were collected and organised.

Data were coded, transcribed, and entered into digital formats for analysis. Qualitative data were categorised thematically, while quantitative scores were tabulated for descriptive analysis.

Proper recording and management ensured data accuracy, reliability, and ease of analysis, while maintaining confidentiality and ethical compliance (Cohen, Manion, & Morrison, 2018).

3.8 Data Analysis

Data were analyzed qualitatively using thematic analysis guided by Braun and Clarke's (2006) six-phase model: familiarisation with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report.

Transcribed data from focus group discussions, interviews, observations, and reflective journals were coded and categorised into themes related to colour understanding, creativity, and design improvement. The analysis emphasised participants' voices, reflections, and meanings, thereby aligning with the participatory and interpretive nature of PAR.

3.9 Validity and Reliability (Trustworthiness)

3.9.1 Validity

Validity refers to the extent to which the research instruments measured what they were intended to measure.

Instruments such as questionnaires, observation checklists, and interview guides were reviewed by subject experts in art and design education for relevance and accuracy. A pilot test was also conducted with a small group of students to refine questions and procedures.

Ensuring validity increased the credibility of findings by confirming that the data collected truly reflected students' experiences and performance in colour conceptualisation (Cohen, Manion, & Morrison, 2018).

3.9.2 Reliability

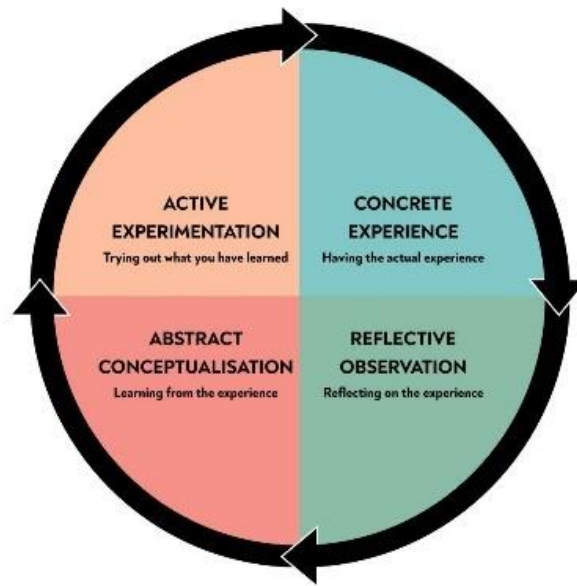
Reliability refers to the consistency and dependability of research instruments over repeated use.

Instruments were standardised, with observation checklists applied uniformly, and questionnaires administered under the same conditions. Reflective journals and performance records were collected at regular intervals to ensure stability of responses.

Reliability guaranteed that data collected could be replicated and trusted, reducing biases or errors that might distort the study's outcomes.

Validity and Reliability; The study applied Kolb's Experiential Learning Model, engaging participants in a continuous cycle that included sharing experiences about the current state of graphic design, observing and reflecting on those experiences, discussing strategies for improving performance, and implementing the agreed-upon actions. Kolb's Experiential Learning Model.

The study utilised Kolb's Experiential Learning Model by guiding participants through all four stages of the cycle. First, Concrete Experience was achieved through sharing personal experiences about the current state of graphic design. This was followed by Reflective



Source: Kolb (1984).

Observation, where participants critically examined and discussed what they had observed. Abstract Conceptualisation involved generating ideas and developing strategies for improving performance. And, Active Experimentation was carried out by putting the agreed-upon measures into practice, allowing the cycle of learning to continue.

Observation checklists were pre-tested with 32 students and 2 teachers to ensure effectiveness.

Research instruments were reviewed by mentors and peers to establish content validity.

Application of Kolb's Experiential Learning Model and iterative PAR cycles enhanced reliability of observations and interventions (Rai & Thapa, 2015).

3.10 Ethical Considerations

Ethical clearance was obtained from the Directorate of Research and Graduate Training, Kyambogo University, and permission from the Mbogo High School administration. Participants were fully informed about the purpose and process of the study and provided written consent

before participation. For students below 18 years, parental consent was obtained through the school administration.

Confidentiality was maintained by using pseudonyms and securely storing data. Participation was voluntary, and individuals could withdraw at any stage without consequence. The researcher observed integrity in data collection, analysis, and reporting by avoiding plagiarism, data fabrication, or misrepresentation, in line with Kyambogo University ethical guidelines and APA (7th edition) standards.

3.11 Summary

This chapter detailed the methodology used to examine strategies for improving colour conceptualisation in graphic design at A-Level. A Participatory Action Research design guided by the CBC and Kolb's Experiential Learning Model was employed. The study engaged 32 students, 2 teachers, and 2 administrators using purposive sampling. Data were collected through multiple instruments, analysed with mixed methods, and validated for accuracy and reliability. Ethical principles were observed to ensure integrity. The next chapter presents the findings of the study.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.0 Introduction

This chapter presents and discusses the findings of the study, based on the purpose, objectives, and research problem. The study aimed to improve the performance of Senior Six students in graphic design at Mbogo High School by enhancing their ability to conceptualise and apply colour effectively in projects.

Data were generated from practice-based action research activities, drawing on pedagogical strategies developed and tested at Kyambogo University (KYU) in vocational and commercial studies. A purposive sample of 32 Senior Six Art and Design students and two teachers participated. Pseudonyms were used to ensure confidentiality.

Data were collected through Future Workshop sessions, classroom observations, focus group discussions (FGDs), reflective journals, and photographic documentation. Figures and plates illustrate real student work and activities, with permission granted for their use.

The chapter is organised according to the revised study objectives:

1. To identify and analyse the principles of colour applied in graphic design.
2. To design and implement learning activities that promote colour conceptualisation.
3. To evaluate student graphic design layouts to determine mastery of colour application.

4.1 Objective 1: Identifying and Analysing Principles of Colour Applied in Graphic Design

This objective explored students' understanding of colour principles prior to intervention. Data from the Future Workshop revealed limited awareness of theoretical and practical aspects of colour use in design.

4.1.1 Hero Colour Selection

Students learned the concept of hero colours, dominant colours associated with specific emotions or design themes. For example, red symbolised urgency, blue suggested calmness, and yellow/orange represented warmth.

“I often struggle with selecting the right colours for my projects. Without proper guidance, I feel lost, and this shows in my work.” (LS, personal communication, February 27, 2019)

The Foods and Nutrition Laboratory was used as a temporary design room due to good natural lighting and adequate workspace, facilitating observation and evaluation.

4.1.2 Colour Combinations and Relationships

Students practiced:

Monochromatic schemes – tints and shades of a single hue.

Complementary contrasts – e.g., red/green, blue/orange, yellow/purple.

Analogous schemes – adjacent colours on the colour wheel for visual harmony.

“Practicing complementary and analogous colours helped me understand harmony. My final project looked much better than my first attempt.”

(MN, personal communication, February 27, 2019)

These activities improved students’ ability to create balanced, harmonious, and visually appealing designs.



Source; primary data 2019.



Figure 4: Understanding primary, secondary, and tertiary colour relationships.

Source: Primary data; photo taken by researcher, Foods & Nutrition Lab, Mbogo High School, February 2019.

4.2 Objective 2: Designing and Implementing Learning Activities That Promote Colour Conceptualization

The second objective focused on developing and testing activities to strengthen students' conceptual understanding of colour. Activities followed Kolb's experiential learning cycle: concrete experience, reflective observation, abstract conceptualisation, and active experimentation.

4.2.1 Learning Activities Implemented

Hero Colour Exercise: Students identified a dominant colour representing their project theme.

Colour Wheel Drills: Learners mixed primary colours to create secondary and tertiary hues, experimenting with tints and shades.

Composition Practice: Students applied colour combinations in posters and digital layouts.

Peer Critique Sessions: Students presented work and received constructive feedback.

4.2.2 Evidence of Learning

Students reported increased confidence and conceptual clarity:

“During the hero colour exercise, I realised how choosing the right colour can change the mood of my design. I now feel more confident applying this in my projects.”

(LS, personal communication, February 27, 2019)

“Experimenting with tints and shades helped me make my design pop and look professional. I feel I can control the colours now.”

(VN, personal communication, February 27, 2019)



Figure 5: Students applying colour combinations and tints during guided practice.

Source: Primary data; photos taken by researcher, Foods & Nutrition Lab, Mbogo High School, February 2019.

These activities bridged theory and practice, enabling students to move from random experimentation to intentional, thematic colour use.

4.3 Objective 3: Evaluating Student Graphic Design Layouts to Determine Mastery of Colour Application

Evaluation focused on students' work before and after intervention, using formative and summative criteria: colour harmony, contrast, composition, originality, and communication effectiveness.

4.3.1 Performance Results

Table 4.1 shows students' scores before and after intervention. Significant improvement was observed, especially among initially low-performing students (e.g., KC, KR, and NR).

Table 4.1: Students' Performance Before and After Intervention

Student	Lower score 1	Improved score 1	Lower score 2	Improved score 2
TK	35	60	40	68
RN	40	56	46	60
VN	50	65	53	78
LS	55	70	52	75
MN	40	56	48	66
KC	41	68	46	68
KH	42	66	47	70
KB	45	66	47	71
KG	50	71	50	72
KH	55	73	55	74
LS	60	66	58	78
MA	65	78	59	76

BE	62	78	57	75
BU	55	80	60	82
FY	54	85	50	78
HJ	30	78	54	78
HA	35	67	54	68
HF	45	70	56	68
JA	46	55	53	63
KH	47	56	50	60
KR	34	56	40	58
KC	32	51	33	53
NS	31	60	41	61
NM	40	58	55	67
KS	45	60	50	70
NR	43	53	48	57
NM	44	54	47	57
NS	45	60	48	63
NR	46	54	49	66
NS	45	60	50	68
NT	34	63	42	68
NH	37	60	43	60

Figure 4.1: Comparison of pre- and post-intervention scores for 32 students.

Source: Primary data; generated by researcher, February 2019.

Observation: Most students demonstrated significant improvement, particularly those with initially low scores (e.g., KC, KR, NR), confirming the effectiveness of the interventions.

4.3.2 Evaluation of Final Projects

Using **Kolb's experiential learning model**, students engaged in iterative cycles of action, reflection, discussion, and revision. Observations indicated:

Enhanced colour selection and palette harmony.

Improved typography, composition, and overall aesthetics.

Increased confidence and active engagement in graphic design tasks.

Plate 1 illustrates a student project before intervention, showing random colour use and poor visual harmony. Plate 2 shows the same project after intervention, with deliberate hero colour use, complementary contrasts, and improved composition.

“At the beginning of my project, my colour selection was poor, and I felt frustrated. With guidance, I applied the colour wheel and improved my project significantly.”

(MN, personal communication, March 2019)

These results indicate that the designed learning activities positively impacted students’ ability to conceptualise and apply colour effectively.



Figure 6: The researcher evaluates the students' projects/ layouts that are linked to colour conceptualization

Source: primary data 2019



Figure 7: Students selecting and applying their hello colours in the work.

Source: primary data 2019

4.4 Summary

This chapter presented and discussed findings in line with the **revised study objectives**. Practice-based interventions, grounded in KYU pedagogical experiments, helped students:

Identify and analyse hero colours and other colour relationships.

Apply structured learning activities to conceptualise and use colour effectively.

Produce improved graphic design layouts, demonstrating mastery of colour application, composition, and visual harmony.

Photographic evidence and participant feedback confirm the interventions' effectiveness, supporting the view that experiential, problem-based learning strategies can enhance student performance and engagement in graphic design. These findings provide a basis for scaling similar interventions in other schools and contexts.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Summary

The study sought to improve A-Level students' performance in graphic design at Mbogo High School through strengthening their understanding and application of colour. The research was guided by three objectives:

1. To identify and analyse the principles of colour applied in graphic design.
2. To design and implement learning activities that promote colour conceptualisation.
3. To evaluate student graphic design layouts to determine mastery of colour application.

Findings revealed that most students initially had limited understanding of colour theory, including basic relationships such as complementary, analogous, and triadic schemes. Teachers also reported difficulties in explaining colour principles effectively, largely due to limited pedagogical preparation and lack of instructional materials.

The intervention introduced practical learning activities such as hero colour exercises, colour wheel drills, peer critiques, and composition practice. These participatory and hands-on methods significantly improved student engagement, comprehension, and creative application of colour in design projects. Post-intervention evaluations showed that students produced better compositions, achieved more balanced colour relationships, and demonstrated higher confidence in selecting and applying colours for visual communication.

Overall, the findings confirmed that integrating experiential, interactive, and reflective approaches in teaching colour enhances conceptual understanding and practical performance in graphic design.

5.2 Conclusions

The study aimed at addressing the persistent challenge of poor performance in A-Level graphic design by exploring how improved colour learning activities could strengthen students' conceptual and practical skills. Based on the findings, several conclusions were drawn.

Understanding of Colour Theory is Foundational to Graphic Design Performance; The research confirmed that limited comprehension of colour theory is a major contributor to weak performance in graphic design. Students who lacked knowledge of fundamental concepts such as hue, saturation, value, and colour harmony struggled to make informed design choices. When students gained deeper theoretical and practical understanding—through guided exercises like the colour wheel and hero colour selection—their compositions became more aesthetically coherent and professionally appealing. Therefore, mastery of colour theory forms a critical foundation for success in graphic design and must be prioritized in teaching and assessment.

Teacher Competence and Pedagogical Approaches Influence Student Outcomes; The study concluded that teacher competence, pedagogical strategy, and the ability to translate theory into practice significantly shape students' learning experiences. Many teachers initially relied on traditional, lecture-based methods that emphasised theory over application. These methods did not cater to the visual and experiential learning nature of design students. However, when teachers adopted participatory and student-centered approaches, learners became more engaged, inquisitive, and confident in experimenting with colour. This demonstrates that teachers are central agents of change in promoting meaningful learning and that professional development in art pedagogy is essential.

Resource Availability Determines the Depth of Learning; Another important conclusion is that the adequacy of learning resources directly affects the quality of instruction and learning outcomes. The lack of colour wheels, reference charts, paints, and digital design tools limited students' opportunities to visualise, practice, and internalize colour relationships. Once these resources were introduced during the intervention, learners could experiment more freely and achieve deeper conceptualisation. The study thus underscores the importance of resource provision and institutional investment in art and design education.

Experiential and Reflective Learning Enhances Conceptual Mastery; The findings demonstrated that practical, experiential learning methods such as peer critique, collaborative exercises, and project-based assignments enable students to integrate theoretical knowledge with creative practice. Through these interactive sessions, students developed the ability to analyse their own and others' works, makes informed revisions, and apply feedback constructively. This process

built not only skill but also critical thinking, aesthetic judgment, and self-evaluation qualities essential for professional design practice. Therefore, experiential learning should be embedded within all stages of graphic design instruction.

Action Research is an Effective Approach for Educational Improvement; The study concluded that the action research model is particularly suitable for improving art and design education. It provided a framework for diagnosing learning challenges, implementing targeted interventions, and reflecting on their outcomes in real classroom contexts. This cyclical process of planning, acting, observing, and reflecting helped refine teaching strategies and empowered both teachers and learners as co-investigators in the learning process. Action research therefore serves as a valuable tool for continuous improvement in teaching practice.

Broader Educational Implications; Beyond Mbogo High School, the study has wider implications for graphic design education in Uganda. It emphasises the need to reposition art and design as both cognitive and practical disciplines that require creative inquiry, reflection, and skill-based learning. The research also highlights the necessity of aligning the curriculum with modern design trends and competency-based education standards. By integrating colour theory and practical design exercises, schools can nurture students who are not only artistically skilled but also conceptually aware and industry-ready.

In conclusion, this study demonstrates that improved understanding and use of colour—achieved through experiential, participatory, and reflective learning—significantly enhances students' performance in graphic design. Teacher competence, adequate resources, and supportive pedagogy form the foundation for this transformation. Therefore, strengthening these areas is essential for elevating the quality of art and design education and producing learners who can think, create, and communicate effectively through visual language.

5.3 Discussion

The study's findings revealed that poor student performance in graphic design largely stemmed from three factors: limited understanding of colour theory, inadequate teaching strategies, and insufficient learning resources. These issues resonate with Alami (2016), who observed that ineffective teaching methods and resource scarcity hinder student achievement. The findings also

align with Rai and Thapa (2015), who emphasised the importance of skilled instruction and adequate time allocation for meaningful learning.

The successful implementation of participatory learning activities confirmed the value of experiential education as advanced by Kolb (1984) and later supported by Beckwith (2015), who stressed that reflective practice deepens artistic understanding. The study thus reinforces the theoretical perspective that learning in creative disciplines must be interactive, iterative, and contextually grounded.

Overall, the research adds to the growing body of evidence that adopting active learning and reflective strategies can transform art and design education from rote-based to inquiry-driven practice, producing more competent and creative learners.

5.4 Recommendations

Strengthen Teacher Training: Organise continuous professional development workshops on colour theory, digital design, and student-centered pedagogy to enhance teacher competence.

Provide Adequate Learning Resources: Schools should invest in essential teaching aids such as colour wheels, paints, reference materials, and digital software. Introducing an art resource fee may help maintain these supplies sustainably.

Adopt Experiential Learning Approaches: Teachers should integrate project-based learning, peer critiques, and reflective journals to foster deeper understanding and engagement.

Align Assessment with Learning Outcomes: Evaluation should emphasise practical application of colour principles through portfolios and project work rather than theoretical recall alone.

Promote Curriculum Innovation: The Ministry of Education and UBTEB should revise the graphic design curriculum to reflect modern design practices and the Competency-Based Curriculum framework.

Encourage Continuous Research: Higher institutions should promote action research in design pedagogy to support evidence-based improvements and strengthen the creative industry.

REFERENCES

- Alami, M. (2016). *Causes of poor academic performance among Omani students. International Journal of Social Science Research*, 4(1).
- Baker, A. (2014). *Fundamentals of graphic art*. Kampala, Uganda: MK Publishers.
- Beckwith, M. (2015). *Art and design teaching: Developing effective studio practices*. London: Routledge.
- Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House*, 83(2), 39–43. <https://doi.org/10.1080/00098650903505415>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Bruner, J. (1996). *The culture of education*. Cambridge, MA: Harvard University Press.
- Burgess, L. (2015). *Experiential learning in art and design education*. London: Routledge.
- CBC, NCDC. (2020). *Competency-based curriculum framework for A-Level art and design*. Kampala, Uganda: National Curriculum Development Centre.
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). London: Routledge.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage Publications.
- DHHHS. (2012). *Ethical guidelines for human and social research*. Washington, DC: U.S. Department of Health and Human Services.
- Fosnot, C. T. (2013). *Constructivism: Theory, perspectives, and practice* (2nd ed.). New York: Teachers College Press.
- Itten, J. (1970). *The elements of colour*. New York: Van Nostrand Reinhold.

- Jailani, M. Y., & Faizal, M. (2017). *Developing vocational pedagogy for technical education*. Kuala Lumpur: Malaysian Technical University.
- Jungk, R., & Müllert, N. (1987). *Future workshops: How to create desirable futures*. London: Institute for Social Inventions.
- Kaput, K. (2018). *Evidence for competency-based education*. Saint Paul, MN: Education Evolving.
- Kemmis, S., & McTaggart, R. (2005). *Participatory action research: Communicative action and the public sphere*. In N. Denzin & Y. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Kumi, P. K., Asimeng-Boahene, L., & Ameyaw, F. (2015). *Quality in vocational education: Issues and challenges*. Accra: University of Cape Coast Press.
- Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, 2(4), 34–46.
- Lucas, B., Spencer, E., & Claxton, G. (2012). *How to teach vocational education: A theory of vocational pedagogy*. London: City & Guilds Centre for Skills Development.
- McNiff, J., & Whitehead, J. (2011). *All you need to know about action research* (2nd ed.). London: Sage Publications.
- Mehl, R. (2019). *Three basic principles of colour theory for designers*. New York, NY: [Publisher not specified].
- NCDC. (2022). *Art and design A-Level syllabus*. Kampala, Uganda: National Curriculum Development Centre.
- Rai, R., & Thapa, R. (2015). *The impact of project-based learning in art and design education*. Kathmandu: Tribhuvan University Press.

Saragih, S., & Napitupulu, E. (2015). *Developing learning models for vocational education*. Medan: State University of Medan.

TVET. (n.d.). *Technical and Vocational Education and Training policy framework*. Kampala, Uganda: Ministry of Education and Sports.

UNEB. (n.d.). *A-Level art and design examination reports*. Kampala, Uganda: Uganda National Examinations Board.

Zhejiang Mersity. (2017). *Innovations in design and technology education*. Hangzhou, China: Zhejiang University Press.

APPENDICES

Appendix 1: Questionnaire for Students

Dear Student,

You are requested to complete this questionnaire aimed at collecting data on improving the colour selection and use in the discipline of graphics at Mbogo High School. Your opinions are very important and will be treated with strict confidentiality. The information will only be used for this study.

Instructions: Tick (✓) where appropriate.

Section A: Background Information

Sex:

Male ☐

Female ☐

Age:

16–18 ☐

19–20 ☐

21–24 ☐

Section B: Learning Activities in Graphic Design

How do you view the learning activities of art and design at Mbogo High School?

Very good ☐

Good ☐

Fair ☐

Bad ☐

Why do you think graphics is being taught this way?

a. Good and Very Good:

Teachers are interested ☐

Teachers are competent ☐

The subject is interesting ☐

b. Bad:

Teachers are not interested ☐

Teachers are incompetent ☐

There are no teaching materials ☐

Are there any particular projects in graphics that are difficult to teach/learn?

Yes ☐

No ☐

If yes, which projects are difficult to teach or learn? (Tick all that apply)

Monogram ☐

Badges ☐

Calendars ☐

Logos ☐

Coats of Arms ☐

Packages ☐

Emblems ☐

Cards ☐

Wrapping/Rapping papers ☐

Magazines ☐

Posters ☐

Others (specify) _____

Why are these projects difficult to teach or learn? (Tick all that apply)

Lack of materials ☐

Content is difficult to grasp ☐

Teachers dislike them ☐

They have not been taught for long ☐

Other (specify) _____

Do you undertake the projects of graphics in your combination?

Yes ☐

No ☐

If yes, how do you assess its teaching by your teacher?

Very good ☐

Good ☐

Fair ☐

Bad ☐

Is the popularity of graphics among students increasing or decreasing?

Increasing ☐

Decreasing ☐

If increasing, what factors are responsible?

Interesting ☐

Very useful in life ☐

Easy to pass ☐

Other (specify) _____

If decreasing, what are the reasons?

It is boring ☐

Difficult to learn ☐

Lack of materials ☐

Difficult to pass ☐

It is despised as an occupation ☐

Others (specify) _____

Section C: Colour Applicability

How do you assess the teachers who teach colour theory in art?

Competent ☐

Incompetent ☐

Somehow competent ☐

Other (specify) _____

How do you assess the competence of graphic design teachers in teaching colour theory?

Sufficient ☐

Insufficient ☐

Satisfactory ☐

Unsatisfactory ☐

What factors contribute to the level of competence of graphic teachers in your school? (Tick all that apply)

Level of qualification ☐

Experience in teaching ☐

Teaching environment ☐

Other (specify) _____

How do you assess the curriculum of graphics in your school?

Appropriate ☐

Inappropriate ☐

Sufficient in content ☐

Insufficient in content ☐

Others (specify) _____

To what factors would you attribute the nature of the curriculum pertaining to graphic design?

What problems affect the teaching of graphic design?

What solutions would you suggest to the problems identified above?

THANK YOU FOR YOUR TIME AND COOPERATION

Appendix 2: Interview Guide

Dear Respondent,

You are requested to participate in this interview aimed at collecting data on improving the colour selection and use in graphics at Mbogo High School. Your opinions are very important and will be treated confidentially.

Section A: Background

Age: _____

School where you are teaching: _____

Qualifications and educational background: _____

Section B: Interview Questions

In your opinion, how do teaching methods influence the teaching of graphics work in Mbogo High School?

In what ways does teachers' experience influence the teaching of graphics work?

In what ways does teachers' training influence the teaching of graphic work?

How does availability of instructional materials affect the teaching of graphics work?

THANK YOU FOR YOUR TIME AND COOPERATION

APPENDICES

Appendix A. Causes of Poor Performance in Graphics

Short Term	Medium Term	Long Term
Poor colour selection	Accuracy of construction of letters	Poor management
Proper illustration	Availability of materials and tools	Lack of interest
Proper layout	Favorable environment	Examination fear
Teaching updated	Poor measuring terms	Limited skills
syllabus	Inadequate time	Teachers favors of
Self-drive	Poor shading skills	some students
Poor attitude towards the	Lack of exposure	Lack of passion
teacher	Lack of consultation	Limited competition
Inadequate materials and		Teacher's character
tools		Teachers over
Peer Pressure		Poor thinking
Un favorable		capacity
Environment		Lack of exposure to
Teaching what is not on		the seminars
syllabus		Positive attitude
		towards the teachers

Appendix B. The challenges using pair wise matrix.

PROBLEM	1	2	3	4	TOTAL	RANK
1		1(22)	3(20)	1(16)	5	1st
2			1(20)	1(16)	2	2nd
3				3(19)	3	3rd
4					1	4th

Appendix C. Implementation Plan

No.	Task / Activity	Responsible Person(s)	Process / Steps	Timeframe	Indicators of Achievement
1.	Formation of the Learning and Monitoring Team	Researcher, Art Teacher, Selected Students	• Identify participants for the learning and monitoring team • Orient members on objectives and roles • Agree on schedule and tools for observation	Week 1 (February 2019)	• Team established • Observation schedule prepared • Signed attendance and briefing records
2.	Baseline Observation and Diagnosis	Researcher, Art Teacher	• Observe students during regular graphic design lessons • Record baseline data using observation checklist	Week 1	• Baseline data recorded • Observation checklist completed
3.	Conducting Lesson on Colour Theory	Researcher	• Introduce colour concepts (hue, tone, contrast, harmony) • Use practical demonstrations and visual aids	Week 2	• Lesson delivered • Students' sketches show understanding
4.	Organizing Group Practical Activities	Researcher, Art Teacher, Students	• Form design groups • Assign design briefs • Guide students	Week 3	• Group work underway • Students applying colour concepts

			to apply colour theory in projects		
5.	Facilitating Peer Critique and Reflection Sessions	Researcher, Students	• Organize group discussions on colour use • Facilitate peer evaluation and self-reflection using journals	Week 4	• Reflection journals completed • Peer critique notes recorded
6.	Exhibition of Student Work	Students, Art Teacher, Researcher	• Plan and exhibit of completed works • Display improvement in colour use	Week 5	• Exhibition held • Photographs and feedback recorded
7.	Evaluation and Documentation	Researcher, Art Teacher, Students	• Review overall learning outcomes • Conduct focus group discussions and interviews • Document findings	Week 6	• Evaluation reports • Recorded interviews and summaries

Appendix D: Students' Performance Scores Before and After the Colour Learning Intervention

Student	Lower score 1	Improved score 1	Lower score 2	Improved score 2
TK	35	60	40	68
RN	40	56	46	60
VN	50	65	53	78
LS	55	70	52	75
MN	40	56	48	66
KC	41	68	46	68
KH	42	66	47	70
KB	45	66	47	71
KG	50	71	50	72
KH	55	73	55	74
LS	60	66	58	78
MA	65	78	59	76
BE	62	78	57	75
BU	55	80	60	82
FY	54	85	50	78
HJ	30	78	54	78
HA	35	67	54	68
HF	45	70	56	68
JA	46	55	53	63
KH	47	56	50	60
KR	34	56	40	58
KC	32	51	33	53
NS	31	60	41	61

NM	40	58	55	67
KS	45	60	50	70
NR	43	53	48	57
NM	44	54	47	57
NS	45	60	48	63
NR	46	54	49	66
NS	45	60	50	68
NT	34	63	42	68
NH	37	60	43	60

Appendix E. Introduction Letter to seeking permission to hold the Futures Workshop meeting