

UNIVERSITY OF EDUCATION, WINNEBA

**Use of graphic design softwares in instructional delivery in selected Senior High
Schools in Agona East District**



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UNIVERSITY OF EDUCATION, WINNEBA

**USE OF GRAPHIC DESIGN SOFTWARES IN INSTRUCTIONAL
DELIVERY IN SELECTED SENIOR HIGH SCHOOLS IN AGONA
EAST DISTRICT**

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(220017146)**

**A dissertation in the Department of Educational Foundations,
submitted to the School of
Graduate Studies in partial fulfilment
of the requirements for the award of the degree of
Postgraduate Diploma in Education
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in the University of Education, Winneba**

The logo of the University of Education, Winneba, is a circular emblem. It features a red outer ring with the text 'UNIVERSITY OF EDUCATION, WINNEBA' in white. Inside the ring is a blue and white design with a central star-like shape. Below the emblem is a banner with the motto 'EDUCATION FOR SERVICE'.

MAY, 2023

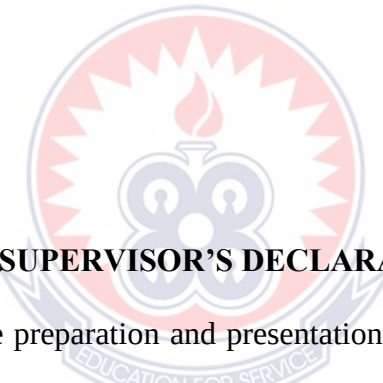
DECLARATION

STUDENT'S DECLARATION

I, Matthew Kobina Ameyaw, declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature.....

Date.....

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SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for the supervision of the dissertation as laid down by the University of Education, Winneba.

Dr. Adam Awini

Signature:

Date.....

DEDICATION

To my family and well-wishers



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ABSTRACT

The study sought to explore the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District. The study employed quantitative descriptive survey research design. A sample size of 6 teachers and 285 students was selected from Swedru SHS and Nsaba Presbyterian SHS, using a multi-staged sampling technique comprising purposive, simple random sampling and census. The study used questionnaire to collect data from teachers and students and data were analyzed descriptively into frequencies and percentages using SPSS (version 23.0). The study findings revealed that, CorelDRAW and Adobe Photoshop were the commonly used graphic design software in instructional delivery in the study areas. Also, the findings revealed that, the major barriers to graphic design software used in instructional delivery at the study areas were time constraint, lack of basic training for teachers and inadequate computers for both teachers and students. Finally, the findings from the study showed that, graphic design software used in instructional delivery have significant effects on students' motivation to learn graphic design. Specifically, it helps visual arts students to develop new ideas on their own, it makes them enjoy graphic design lessons, it encourages them to participate in graphic design and also increase their motivation to learn graphic design. Based on these findings, the researcher recommended that, government should invest more in ICT education in all schools across the country.



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Graphic Design is an ancient craft, dating back past Egyptian hieroglyphs to at least 17, 000-year-old cave paintings. It continues to cover a range of activities including logo creation, aesthetic appeal and attract viewers using images, color and typography. According to Adom (2014), Graphic Design is a branch of visual art that concerns itself with communication with the general public through the use of visual images such as letters, photographs, symbols, colours and drawings. The Graphic Designer employs these visual images in creating various communication media to inform, educate, warn, advertise or give information about products and services. A Graphic Designer may use a combination of typography, visual arts and page layout techniques to produce communication products.

As a Graphic Designer who has worked in a printing press for some years, I have noted that post Senior High School (SHS) Graphic Design students, and some first-year technical university students who offered Graphic Design have little or no knowledge about Graphic Design software's for designing but in their syllabus, they should have been taught, learnt them and use them in their practical lessons.

The conceptual understanding of Graphic Design software at the Senior High School is indispensable when it comes to pursuing Graphic Design courses in Ghana. The knowledge in Graphic Design is undoubtedly a necessity to the development in most areas of life and the economies of the world. Apart from knowledge in computation, Graphic Design also helps individuals to think originally, skillfully and critically through its numerous cognitive components. Therefore, the researcher deems it a need to find out how they are taught, the benefits, and the challenges that prevent them

from getting that knowledge which they should have at the Senior High School (SHS).

According to Hamat and Mohamed Amin (2009), educators need to start by understanding the technology and its features and the benefits they bring to them. Teaching and learning skills require an effective instructional theory so that they facilitate the understanding and become beneficial to all parties. An empirically confirmed way to foster student engagement is through high-quality instruction. Regarding this point, (Harbour et al., 2015) stated, "As the agents of instruction, teachers and what they do are critical to increasing student engagement". Acknowledging teachers as critical agents in determining students' academic success and supporting the research that affirms the teacher is the most influential school-based force in student achievement (Stronge, 2018).

Graphic Design teachers are to introduce students to Corel Draw and any other software such as Paint Box, Photoshop, Illustrator, and Quark - Xpress to enable the students to use the computer to design and produce visual communication media items such as stickers, posters, trademarks, and labels, according to the Curriculum Research Development Division of Ghana Education Service Teaching Syllabus for Graphic Design (2008). It is therefore critical that teachers understand how to use computers in order to effectively assist their students.

1.2 Theoretical Framework

The three-phased ideation model proposed by Brown (2008) served as the foundation for this study's theory. According to this concept, "idea" is seen as a fundamental thinking component that can be either visual, concrete, or abstract, and ideation is considered as a process of generation, development, and communication" (Johnson, 2005). It is a sense-making exercise that aids in our quest for a clearer understanding

that informs our design solution (Kimbell, 2004). The process of generating, developing, and testing ideas that could result in solutions, according to Brown, is known as ideation. Brown (2008). Ideation entails the mind operating in harmony with the surroundings or tools, whereas design occasionally entails subconsciousness. Ideation can alternatively be defined as the capacity to develop a strategy with a specific goal or outcome in mind (Yeoh, 2002). In the ideation process, one uses their thoughts and tools to brainstorm, organise, sketch, and draw while imagining and thinking about potential ideas for implementation (Kimbell, 2004). As opposed to a predetermined organised sequence of actions, a system of spaces is a better metaphor for this process (Brown, 2008). Ideation is positioned between the "inspiration" and "implementation" loops in Brown's (2008) three-phase design-thinking paradigm. According to Brown, the process will loop around multiple times as ideas are improved and new routes are explored. For the purposes of this study, ideation refers to the processes of quick sketching, brainstorming, and organising that produce the actualization of a desired concept for implementation with teacher approval. Such a concept must outline the arrangement of the text, fonts, and photos, which will then be improved by the students' addition of pertinent images.

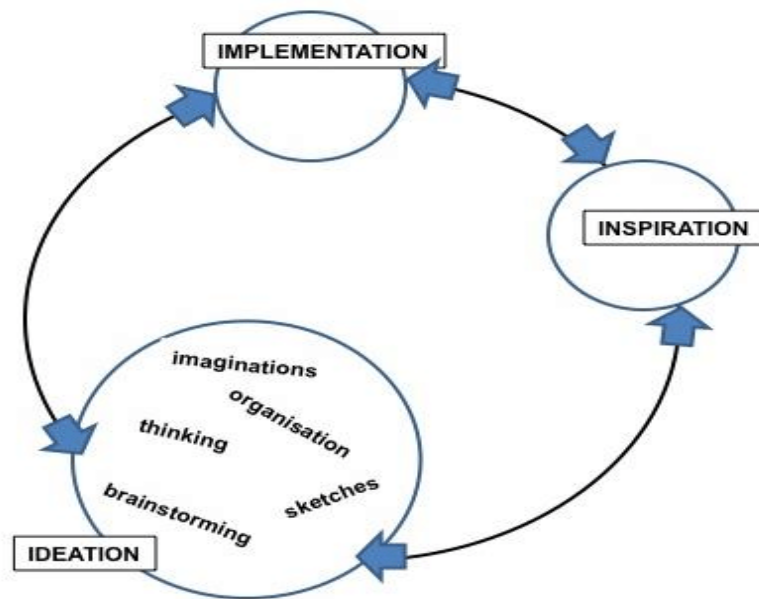


Figure 1: A three-phase design-thinking model for design process (Brown, 2008).

1.2.1 Theoretical Application

Both graphic design and idea development entail dynamic and evolutionary procedures for producing new things. Design practitioners and educators share the belief and agreement that all design solutions should result from the idea development process, as shown by the solution offered for a given task, whether it be academic or professional. Based on the designer's underlying decisions, each idea goes through its own process before being finished. It must also adhere to the project's design brief for the client and other stakeholders to be satisfied with the finished product. According to Dunmill and Arslanagic's (2006) study, ICT includes a variety of human-developed hardware, software, and telecommunications technologies that provide cross-border communication and data exchange and can be used to create art experiences and goals. In the information age of today, information and communication technologies (ICT) have developed into essential instruments that have a significant global impact on people's lives. In education, this impact is particularly notable. ICT has enhanced learning outcomes, according to research (Yeoh, 2002; Arntson, 2011; Appiah & Cronje, 2014). Additionally, studies on the advantages that students, instructors, and

administration experience as a result of using ICT for graphic design and developing basic ideas have supported this claim. Graphic design has recently had a favourable effect on the country's economic growth and has raised people's standards of living in most of the world.

It is also agreed that ideation has historically viewed the most imaginative and abstract aspect of the design process since it is naturally linked to the imaginary. This is known as creating and modifying representation in design ideation. ICT as a tool for idea generation has also created a new method for designers to discuss the effects of technology, particularly throughout the idea development process (Appiah & Cronje 2014). Students can fully transition into using computers as a tool for visual design after mastering these basic processes, which would otherwise need more complex operations. It was also learned that it is the teacher's obligation to instruct the students on how to use these tools and how much practise they may get with them.

Even though these concerns the HEI, it is important to consider how idea development is handled in the senior high schools as well. This is due to the fact that these senior high schools serve as the cornerstone of higher education, and the potential for incorrect foundations to be laid can greatly affect what is relevant in HEI. In order to examine how ICT is influencing ideation in senior high schools, the study set out with the goal of evaluating the usage of ICT for idea formation in Graphic Design with reference to the Senior High School.

1.2 Statement of the Problem

The influence of Computer Aided Design (CAD) on design professional activities has been the subject of much research, but little has focused on teacher student activity with the use of Graphic Design softwares in teaching and learning Graphic Design. There is little use of Graphic Design software in instructional delivery in SHS visual

Art students in the Agona East District. This creates a gap in knowledge so far as Graphic Design subject is concerned. Also, whereas similar studies have been carried out in other part of the country and the world at large, there seem to be nothing at all in Agona East District, particularly in Swedru SHS and Nsaba Presbyterian SHS. It is upon this premises that the researcher aimed to bridge these knowledge and geographical gaps by exploring the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District.

1.3 Purpose of the Study

The main focus of the study was to explore the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District.

1.5 Research Objectives

The study specifically sought to;

1. identify some common graphic design software used in teaching graphic design in the senior high schools.
2. investigate barriers to the use of graphic design software in instructional delivery in senior high schools.
3. examine the effects of computer design software on the learning of graphic design.

1.6 Research Questions

Due to the comprehensive nature of the study, the following research questions guided the researcher in conducting the study:

1. What graphic design software are commonly used in teaching graphic design in the senior high schools?
2. What are the barriers to the use of graphic design software in instructional delivery in senior high schools?

3. What are the effects of computer design software on the learning of graphic design?

1.7 Significance of the Study

The researcher thought that the study would be able to highlight some of the shortcomings in the art studio's instruments and equipment that the school administration does not consider. This study will aid visual arts departments in identifying the key areas of instruction that need improvement for graphic design software. The suggestions can be used by the instructors who teach graphic design to give the students the necessary training, allowing them to perform at the highest level possible when it comes to computer graphics. In order to provide further ideas in the same area of study, other researchers will base their suggestions for discoveries from this study. The results of this study can point the way forward for governmental organisations, educators, parents, and all other interested parties. The accomplishments can be acknowledged and built upon. The issues mentioned can be resolved, and the programme can be modified to better fit the actual circumstances as they are stated. Additionally, it will act as a foundation for further study and contribute to the enhancement of Graphic Design software teaching and learning.

1.8 Delimitation of the Study

Delimitations are the boundaries set or choices made by the researcher in the conduct of a research (Simon, 2011). For the goals of this study not to become impossibly large to complete, it was only possible to look into some common graphic design software used in teaching graphic design, barriers to the use of graphic design software in instructional delivery and the effects of graphic design software on

students' motivation to study graphic design in senior high schools. Geographically, the study was conducted in the Agona East District of Ghana.

1.9 Definition of Terms

Graphic Design	A number of artistic and professional disciplines which focus on visual communication and presentation. It is also the creation and combining words, symbols, and images to create a visual representation of ideas and messages.
Graphics	Pictures or design elements that add visual interest to a page.
Digital	Using signals or information represented by discrete values (digits) of a physical quantity or relating to the use of computer technology: "the digital revolution".
Software	The collection of computer programs and related data that provide the instructions telling a computer what to do.
Instructional	Giving detailed information about how something should be done or operated.
Programme	A series of coded software instructions to control the operation of a computer or other machine.
Computer-aided Design (CAD)	The use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design.

1.10 Organization of the Study

The entire research was structured into five chapters. The first chapter covered the introduction which consisted of the background to the study, a statement of the problem, research objectives, research questions, significance of the study, delimitations and limitations of the study. The second chapter also dealt with the

review of related literature which re-examined theories, concepts and similar studies carried out by other researchers. The third chapter discussed the methods employed in conducting the study. This comprised the research design, study population, sample and sampling techniques, data collection instruments, data collection procedure and methods of data analysis. The fourth chapter analysed and discussed the results from the data collected. The final chapter summarised the key findings of the study, drew conclusions and made recommendations and suggestions for further studies.



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature on the use of graphic design software in instructional delivery in senior high school in Agona East District. The chapter is divided into two sections; namely, conceptual review and empirical review. The conceptual review deals with concepts underlying the topic under study such the education in Ghana, senior high school (SHS) education in Ghana, the senior high school visual arts curriculum, overview of graphic design, visual arts, graphic design and creativity, history of graphic design, graphic design instructional software used in teaching graphic design, how teachers are equipped with graphic software's resource in teaching, how graphic design teachers can incorporate computer software's in their Teaching, impact of graphic design software's integration on students' motivation to study Graphic Design, and barriers to the use of computer graphic design by teachers and students in the teaching and learning of Graphic Design. The empirical review on the other hand re-examines works done by other researchers on the use of graphic design software in instructional delivery in senior high schools. Specifically, it reviews the works of Toffah, Appiah and Boamah (2021), Yeoh (2002), Adiji and Ibiwoye (2017), Wang (2020) and Sebbeth (2017).

2.1 Conceptual Review

This section re-examines issues such as the concept such as overview of graphic design, history of graphic design, graphic design instructional software used in teaching graphic design, how teachers introduce graphic design software's to SHS students, how teachers are equipped with Graphic software's resource in teaching, how graphic design teachers can incorporate computer software's in their Teaching,

impact of graphic design software's integration on Visual Art SHS students' motivation to study Graphic Design, barriers to the use of computer graphic design by teachers and students in the teaching and learning of Graphic Design software's and solutions to challenges involved in using graphic design software in instructional delivery.

2.1.1 Education in Ghana

The majority of education in Ghana was informal and focused on apprenticeship prior to the advent of European settlers, who established a formal education system targeted at the elites (Glavin & Chris, 2017). Pre-colonial Ghana's economy was based on the sharing of farm products between households, and each household's members specialised in providing necessities like food, shelter, clothing, and furniture. As a result, trade with other households took place on a very small scale (Hymer & Stephen, 2018). Because of this, there was no requirement for employment outside the home, which would have required following rules, upholding moral standards, and developing certain skills through a formal schooling system (Akurang & Kwabena-Parry, 2002). Ghana's economy evolved into a combination of the subsistence and formal economies following colonisation (Akurang & Kwabena-Parry, 2002).

Ghana's education indices show differences across the Southern and Northern regions, rural and urban areas, and gender. Public action against illiteracy and unequal access to education is sparked by these gaps. The elimination of illiteracy has been a major goal of Ghanaian education policy for the past 40 years, and authorities are aware of the challenges in guaranteeing fair access to education (Glavin & Chris, 2017). National experts and international organisations have deemed the outcomes of public intervention in both fields to be considerable but insufficient (Association of African

Entrepreneurs, 2019). Increasing vocational education and training in ICT within the education system are also emphasized in Ghanaian education policy. Ghana is attaining 76.2% of what should be feasible given its resources (income), according to the Human Rights Measurement Initiative (HRMI), for elementary education, but just 65.1% for secondary education (Ghana HRM Rights Tracker, 2022).

2.1.2 Senior High School (SHS) Education in Ghana

Ghana offers junior high school graduates who score well on the Basic Education Certificate Examination (BECE) the opportunity to attend senior high school (SHS). BECE results are expressed as an average of the raw marks a candidate receives in the areas for which they write examinations, which comprise English, mathematics, and integrated science as core topics (Dorleku, 2013). BECE is organised and graded by the West Africa Examinations Council (WAEC). According to Table 1, a candidate who receives a Grade A or Aggregate 1 in a topic does exceptionally well, while a candidate who receives a Grade F or Aggregate 6, 7, 8, or 9 has failed in that specific subject.

As a result, a candidate who receives Grade A in six subjects is awarded Aggregate 6, whereas a candidate who receives Grade E or Aggregate 5 in six subjects is awarded Aggregate 30. Details of the WAEC system for evaluating BECE results are shown in Table 1.

Table 1: WAEC Grading System

Marks	Grade	Equivalent Aggregate Score	Interpretation
80-100%	A	1	Excellent
70-79%	B	2	Very Good
60-69%	C	3	Good
45-59%	D	4	Credit
35-44%	E	5	Pass
< -34%	F	6-9	Fail

Source: Ministry of Education (2007)

Only high achievers who receive a BECE Aggregate 6–12 on the WAEC grading scale are qualified to be considered for placement in senior high schools and the elective Business, General Arts, Science, Visual Arts, and associated courses of study. Senior High School achievement is measured by WASSCE results, which qualify students for postsecondary education and the workforce, similar to JHS education, which ends in BECE (Hayford, 2007; Asihene, 2009; Dorleku, 2013).

2.1.3 The Senior High School Visual Arts Curriculum

Home Economics and Visual Arts, which together make up the Vocational Skills programme in senior high school, are alternate options. The Visual Arts curriculum includes specialised study in eight elective disciplines, including General Knowledge in Art, which is a required subject, and sculpture, ceramics, graphic design, picture making, textiles, jewellery, leatherwork, basketry, and (Evans-Solomon, 2004; Asihene, 2009). According to the Teaching Syllabus for Visual Arts published by the Curriculum Research and Development Division in 2008, the programme has been created to give its students the necessary background knowledge and skills for further study in the corresponding elective subjects as well as for self-employment or apprenticeship in the corresponding subjects for those finishing their education at SHS.

Additionally, the Visual Arts Teaching Syllabus classifies the elective courses as either two- or three-dimensional art forms (2-D or 3-D). Graphic design, photography, and textiles are considered 2-D subjects, whereas sculpture, ceramics, jewellery, basketry, and leatherwork are considered 3-D subjects. According to Siaw (2009), in addition to General Knowledge in Art, which is a core topic and is therefore studied

by all students on the Visual Arts curriculum, each student is obliged to choose to study three electives: two from the 2-D category and one from the 3-D category. The West African Senior Secondary School Certificate Examination (WASSCE), which opens doors to further education and the job market, is the result of three years of study in these topics.

Although it is required that visual arts schools offer at least two elective subjects, achieving this goal depends largely on the availability of specialised teachers, necessary studio space, tools, equipment, and pertinent raw materials (Owusu-Afriyie, 2009). As a result, not all schools are able to provide a broad range of electives to enable all students to find the electives that best suit their needs. As a result, students' "choice" of disciplines is typically constrained by the variety of subjects that a school offers, and consequently, by the range of technical and creative abilities that students choosing Visual Arts can develop. The courses that students decide to study in their senior secondary years have a significant impact on their educational and employment prospects once they graduate from school, it is also crucial to emphasise.

The required General Knowledge in Art (GKA) is an odd subject with unique difficulties. According to the 2008 Visual Arts Teaching Syllabus, GKA is a composite subject that was created from all of the Visual Arts courses taken at the SHS level. Its goals are to teach students about the history of art, creativity, and appreciation, as well as the elements and principles of art and how to apply these concepts to a variety of practical art processes. Similar to the optional courses, GKA covers both theoretical and practical material. In order to give the students the necessary communication skills to enable them to speak intelligently about art, the theory aims to broaden their range of art terminology. What is learned in the various subject areas is reinforced by the practical components.

However, unlike the elective Visual Arts subjects, this composite subject has no specialist teachers (Opoku-Asare, 2008), suggesting that all Visual Arts teachers are qualified to effectively teach all of GKA. In addition, General Knowledge in Art for Senior Secondary Schools, the only textbook used to teach GKA, has not been updated since its 1999 publication (Amenuke et al, 1999). Thus, the knowledge, resiliency, inventiveness, and good will of teachers who are in charge of the subject in the various schools are essential to the teaching of GKA. Ghana cannot fully benefit from its citizens' creativity as long as the technical/vocational sub-sector of the country's public educational system is underfunded and unable to positively impact access or human capital development for economic growth (The President's Education Reform Review Committee, 2002). This is true even though visual arts can directly translate secondary education into a consistently economic return (Rihani, 2006).

2.1.1 Overview of Graphic Design

The goal of the visual arts course is for the child to learn about fine arts, develop creative creativity and apply it to all areas of life, express himself via art, and build an aesthetic personality that will allow him to enhance his surroundings (Türkkan, 2008). The importance of teaching art in a variety of approaches is stressed by modern developments in the field. The development of visual perception, comprehension of an artwork in all of its dimensions, incorporation of the artwork's cultural and historical context, and the creative side of art all take on increased significance as a result (Kara, 2020; Smilan, 2016; Yaşan, Sünbül & Yücalan, 2007). Regardless of talent, the school has a duty to ensure the creative and artistic growth of every student. According to Johnson (1965), "artistic talents die or disappear when this development is neglected."

Since there are many different tools and activities with educational value depending on the possibilities of the school and environment, the teacher should have the knowledge and abilities to enable students to learn the content and achievements of the unit. Additionally, it should be able to showcase students' creativity and give them the chance to use the artistic method along with modern teaching strategies, as well as benefit from adequate supplies, equipment, and field trips to museums and art galleries for observation, research, and examination as well as projects and activities. Given that the imagination of secondary school students is one of the most developed, it is crucial to foster their visual creativity in art, support their attitudes towards graphic design, and encourage their imagination in visual arts. The ability of students to use their imaginations depends on their level of creativity in the visual arts and their positive affective dispositions towards it (Dziedziewicz & Karwowski, 2015; Rostan, 2005).

The practise of producing visual information that aids in message communication with a target audience is known as graphic design. Graphic design is the ideal solution in these situations. Visual communication art is crucial, particularly for people, organisations, or entities who wish to interact with their target audience. There are many reasons why graphic design is significant. Every logo designs you've ever seen is built on the first principle. Second, all of the posts and advertisements you see on social media every day are for graphic design goods. According to Drucker (2014), it is also a component of graphic design, book cover design, magazine page layouts, product design, apparel design, and other fields. The art of generating and editing a project's visual components is known as graphic design. Graphic design includes a variety of activities, such as designing a magazine's layout, a play's poster, and product packaging. As a matter of fact, practically everyone today engages in some

aspect of graphic design in their daily lives, whether it is by adding text to an image for social media or by color-coding a spreadsheet for business. Our views and thoughts are frequently accompanied by numerous images in the current era of ubiquitous visual transmission. Graphic spreads knowledge throughout the world and develops into an international language of expression (Holsanova, Holmberg, & Holmqvist, 2009; Zhao, 2020).

A message is intended to be communicated or enhanced through visual design (Bichler & Beier, 2016; Walker, 2017). According to Tian, Lonsdale, and Cheung (2019), graphic design is the visual communication art or profession that mixes words, images, and ideas to communicate information to an audience, particularly to produce a certain effect. Alternatively put, graphic design is communication design; it is a means of expressing ideas through imagery and style. For quick communication between individuals and society, graphic design is a human-centered field with excellent perceptual quality. Effective graphic design makes communication easier. An audience's emotional response and even motivation to act can be induced by well-executed graphic design. For example, the "sign up" page on a website is often designed to entice visitors to join an email list or start a free trial (Kindel, 2017; Weber, 2017).

People with graphic design skills may be able to find employment in a variety of fields. Graduates in graphic design can work for advertising firms, graphic design studios, the press and publishing sector, academic staff in universities' fine arts education and research programmes, art consultants, and graphic designers in public and semi-public institutions, as well as start their own businesses (Pflaeging & Stöckl, 2021). Success in the design process will come from being able to express oneself freely, as it does in all other fields. Therefore, students will be more creative in visual

arts design if they are engaged in emotional interaction, aesthetic values are prioritised, and they can express their opinions and ideas in adaptable environments (Tomita, 2017).

Graphic design is a type of modelling activity that uses visual media to carry information and emotion to the intended audience. Informational, creative, and economical aspects are the three cornerstones of graphic design. The primary purpose of graphic design is to convey information, and this is done most effectively through the combination of symbols, colours, and text elements as well as the message conveyed while considering the audience's needs and the aesthetic appeal of the font, illustration, or photograph. Therefore, graphic design can be defined as "the language of visual art and the form of communication between the sender and the receiver in the information transfer process" (Du & Yu, 2012).

In a multi-communication setting, graphic design is conducted out using experimental and analytical methodologies. Form and content are combined in the planned product by the designer, who arranges the visual components in a pleasing manner while adhering to design principles (Erkan, 2013). The steps of the design process are observation, inquiry, association, imagination, application, and conclusion. In graphic designers, the traits of being critical, inventive, creative, and forward-thinking have evolved. The most crucial step in this process is creativity, which is the capacity to connect novel visual elements and ideas with one another or the capacity to resolve a communication issue (Tunçkan, 2012).

The designer should select and develop the suitable way to use when advertising the good or service in their head, but no matter how effective the approach, if the intended audience does not comprehend, the message will not be received. When

observed by the target audience and the designer, the ability to understand design must depend on cultural accumulation, experiential knowledge, the use of information, and the capacity to see and comprehend clearly. As a result, it can be shown that designers give consideration to shared cultural values, history, and language when choosing their methodologies (Deveci & Bulut, 2016).

The designer can generate original ideas and expand his creativity if he is able to assess the required data that he has gathered via research. Without imagination, creativity, which is regarded as the most crucial stage of design, it is impossible to produce high-quality works (Oztürk, 2017). A creative person uses their observations and intuitions to visualise their work in order to achieve a different form and looks for novel and unexpected solutions (Parlak, 2014). Ron Hoff, the director of creative, says that creative persons have four traits. Good observers who explore possibilities include those who are creative. By influencing the target audience, they want to see the world they produce. In contrast to ordinary people, they take an unconventional approach to the objects they describe (Becer, 2015). Facts and experiments serve as the foundation for creativity, which is both learnable and developable. Using all the facts reveals creative thinking. Information can be replicated in this way, and creativity can grow and evolve (Susuz, Türe, & OZtürk, 2020; Parlak, 2014).

Solutions for the channels that alter peoples' worldviews are produced by design. This circumstance produces tools for design and new chances in the creative industry (Deveci & Bulut, 2016). The creative process begins in the mind. It goes through a creative process that includes deliberation, inquiry, the creation of unique content, critical thought, and analysis. The usage of complicated, intense, and high-level mental skills is required during the creative process, which incorporates both language and visual expression into the design (Zmutlu, 2017).

2.1.5 Visual Arts, Graphic Design and Creativity

The visual arts were the focus of some of the first experimental creativity research, including Patrick's groundbreaking investigations (Botella et al., 2013), which have historically been seen as an important area of creative activity. According to Runco (1997), creativity is traditionally characterised by four elements: person, process, press, and product. According to Lubart (2001), creativity is the capacity to develop novel and situation-specific ideas. One of the most crucial life talents is creativity, which is defined as the capacity to develop original, suitable, and simultaneously helpful ideas or products (Runco & Jaeger, 2012; Shelley, Chiang & Ozturk, 2021).

Additionally, creativity is crucial for completing daily tasks and problems (Csizmadia et al., 2021). According to Gabora and Kaufman (2010), the ability to think creatively is crucial for human effort, evolution, and cultural change. According to most scientists (Runco & Jaeger, 2012; Sünbül, 2005), creativity produces new (original) and significant (useful, relevant) ideas and products.

For the advancement of scientific and technological innovation, as well as artistic, musical, and literary endeavours, creative idea generation is essential (Runco & Jaeger, 2012). According to Runco & Jaeger (2012), visual creativity is the creation of fresh and practical mental visual ideas like sketches and pictures that can result in the creation of new and useful visual forms. The term "useful" in Runco and Jaeger's (2012) definition of creativity refers to outputs that are valuable or effective given the task demands; hence, this definition may include tasks that place an emphasis on the usability, appeal, or uniqueness of solutions.

The multivariate approach to creativity emphasises cognitive, positive, emotional, and environmental elements as the four key components of interest with regard to the

individual (Akdogan, 2021; Jackowicz & Ozturk, 2021; Lubart et al., 2015). Here, the idea of the creative process as an activity or a sort of action received particular attention. For instance, Getzels and Csikszentmihalyi (1976) described a problem posing phase (pre-drawing activity) and a problem-solving phase (drawing and feedback activities) after seeing the creative process in the arts. The research described in this report adds to the expanding body of work that has examined various moments or stages of the creative process utilising a variety of theoretical frameworks and approaches.

Numerous studies have been conducted on the characteristics of creative individuals, particularly artists (Batey & Funham, 2006). The cognitive, affective, emotional, and environmental traits of creators were, however, primarily investigated independently in the past. The cognitive, positive, and emotional traits of the creative individual are combined with favourable contextual factors, according to the multivariate method (Amabile, 1996). The focus on the creative process refers to the investigation of "the sequence of thoughts and actions that give rise to original and adapted ideas" (Lubart et al., 2015) in addition to the multivariate approach to the creative person. The use of one's creative abilities to produce a certain form of creative work is referred to in this sense as the creative process. Children's creative impulse can be stimulated by showing them that there are multiple solutions to a given problem, encouraging them to think outside the box and break free from preconceived notions, and encouraging them to put their ideas into action. They must therefore frequently engage in activities where they can express their creativity. Every lesson has the potential to stimulate the creative drive. In art education classrooms, it offers an opportunity for more expansive thinking. According to Körşolu (2002), "creativity development through art activities helps the development of all intellectual areas in the child."

The generation, interpretation, and modification of vivid mental pictures are all included in the activity of the visual imagination (Thompson et al., 2011). The notion, however, that imaginative creativity is one of the key human traits that promotes the efficient application of creative potential (Runco, Nemiro, & Walberg, 1998) is not a modern one. About a century and a half ago, scientists conducted the first known study of imagination. As research on creativity testing tools developed, tools for measuring visual creative imagination were also developed (Jankowska & Karwowski, 2015).

In the domains of drawing, photography, sculpture, and architecture, visual creativity refers to the capacity to create innovative and practical visual goods (Aziz-Zadeh, Liew, & Dandekar, 2013). According to Pidgeon et al. (2016), visual creativity, which is a very complex cognitive function, involves a variety of processes, including the generation of ideas through improvisation and the assessment of ideas to determine whether a new association can be realised. The capacity to create connections between seemingly unrelated visual components and ideas can be summed up as creativity in graphic design. The designer reflects his design by including universally recognisable pictures in the message he will deliver, and the fictional things in the design might further deepen the meaning. Instead of the depth of content, how the message is delivered also has an impact on the audience (Kaptan & Sayin, 2020).

Visual creativity is important in design since it helps create the ideas and sketches for brand-new, useful products (Pidgeon et al., 2016). Therefore, visual creativity in an artistic context emphasises the aesthetics of visual creative solutions while exhibiting significant cultural characteristics (Damasio, 2001; Hartono & Ozturk, 2022). Despite this distinction, it is generally accepted that creative visual imagery is a process that

contributes to creative thinking, including non-visual creativity (Abraham, 2014; Finke, 2014).

2.1.2 History of Graphic Design

Graphic designers today can learn about earlier artists and their creations by studying graphic design history. By looking at earlier artwork and designs, graphic designers create a "library" of information from which to draw inspiration for their own work. Great artists in the past have created their best work by studying the works of earlier masters. Before he produced his well-known picture of the Last Supper, Rembrandt spent years studying Leonardo Da Vinci's Last Supper (Stokstad, 2002). For a graphic designer, this procedure is the same. To create his or her own work, he or she will research earlier works by similar artists or works by numerous other artists. Since the purpose of graphic design is to communicate a message, the designer must consider the elements that are connected to that message, collect them, and present them in a clear, concise manner so that the viewer can interpret and comprehend the message the designer intends to convey. Learning the history of graphic design is a more focused learning method that is intimately associated with this practise. An education in this area can provide a graphic designer with understanding of the many procedures and trends in graphic design across time. By examining how previous graphic designers, both past and present, successfully communicated their messages within the work, graphic designers can use this information to advance their professional careers. The field of graphic design first began to take shape after Pi Sheng created movable type around 1040 AD. Around the time of the Renaissance, the use of movable type and paper gradually spread throughout Europe. This offered essential components for the creation of books, which at the time was in high demand. With the use of woodblock and copper plate engraving graphics, printing was gradually

improved during the Renaissance. As more printed books became available, various design elements and principles began to stand out more. Typically, the printer and the illustrator handled distinct duties for typesetting and illustrations. During this time, a variety of typefaces and engraving and illustrative techniques became more prevalent. In 1639, printing began to spread to important commercial and economic centres in Europe before reaching North America (Meggs & Purvis, 2006). During the Industrial Revolution in the 18th and 19th centuries, graphic design underwent numerous changes, just like many other industries. The demand for graphic communication is constantly increasing, and technology has enabled higher output by lowering unit costs. The factory concept of specialisation was brought to graphic design in the 19th century. In the past, the printer's duties included typesetting, page layout, and producing the book or broadsheet itself. Now, this was over. The tasks were divided between the designer and the producer. This brought about a lot of changes in the graphic design industry. typographic options have greatly expanded. Everyone in society now has access to colour lithography and photographic printing. The division of labour between the designer and printer is an intriguing phenomenon. Technology caused the division of duties, and it is now the cause of the reunification of those tasks or bodies of knowledge.

Senefelder's invention of lithography in 1796 made it possible to produce printed items more affordably and without the need of raised or incised plates to create an image. Lithography operates under the premise that water and oil do not mix. The lithographic method was enhanced by the Boston School of Chromolithography. The rotary lithographic press, created in 1846 by Richard M. Hoe, could print six times as quickly as a traditional lithographic press. Through the use of this technique, graphic designers were able to produce images with much richer, more vibrant colour than

ever before. A increase in advertisement design happened as printing became more affordable. With Harper's Magazine and its numerous iterations, which were created by the Harper brothers, one of the most well-known periodicals in graphic design emerged from this time period (Meggs & Purvis, 2006).

The various styles within the history of graphic design have been influenced by technology just as it has done so with regard to how it is produced and perceived. With a concentration on book design, the Arts and Crafts period, which roughly spanned 1860 to 1910, demonstrated a return to high craftsmanship. For design unity at this time, incredibly ornate designs that resembled filigree were used. The Doves Press's founder Emery Walker "considered book design similar to architecture, for only careful planning of every aspect-paper, ink, type, spacing, margins, illustration, and ornament-could result in design unity" (Meggs & Purvis, p. 172, 2006). Walker's friend and mentor William Morris founded the Kelmscott Press in 1891. Future generations who aimed to combine art and industry adopted Morris' design philosophy, which called for "workmanship, truth in materials, making the utilitarian beautiful, and fitness of design to function" (Meggs & Purvis, p. 173, 2006).

The late 19th and early 20th centuries saw the emergence of the Art Nouveau style, which was distinguished by organic, flowing, sinuous lines typically derived from flowers or leaves. The revolutionary design philosophy of integrating adornment, structure, and intended purpose was introduced by Art Nouveau. The French designers Chéret, Grasset, Toulouse-Lautrec, and Mucha are responsible for some of the most well-known Art Nouveau pieces. Frank Lloyd Wright and the Glasgow School contributed to the development of Art Nouveau as it entered the twentieth century. Wright adopted a more naturalistic approach to design, believing that the part and the whole are interdependent. Wright's architectural and visual designs combined

rectilinear and curved spatial organisation. Four people that made up the Glasgow School collaborated to create an architectural building with fantastical pictures blending organic and rectilinear shape and design.

During the first ten years of the twentieth century, Peter Behrens was a significant figure in the field of graphic design. By adopting a more sans-serif style and using a grid system to define space and layout of a design, which is still used today, he revolutionised typography. His design was in opposition to the elaborate and flowing type that dominated the era.

Behrens fonts' structure and design were incredibly effective for books and job printing. The work of Behrens as the aesthetic advisor at Allgemeine Elektrizitäts-Gesellschaft (AEG), where he developed a style of fusing neoclassicism and sensible objectivity, is what is most renowned about him. With a pragmatic emphasis on technology, manufacturing processes, and function, where aesthetic interpretation was subordinate to purpose, this style is related to classical forms of harmony and proportion from ancient Greece and Rome (Meggs & Purvis, p. 238, 2006). Later, apprentices of Behrens would create their own movements, most notably the Bauhaus movement.

Graphic design adopted a number of fresh trends at this time, including Cubism, Futurism, Dada, Surrealism, and Expressionism. Cubism's mentality encouraged designers to experiment with geometric shapes and view spatial relationships differently. Italian poet Filippo Marinetti founded futurism in 1909. His poetry were illustrated using a minimal palette of hues and a jumbled arrangement of typefaces to emphasise key points. He created a nonlinear dynamic composition method in place of uniform and grid-like structures. This demonstrates the mindset in design that recognises when to break and when not to break the "rules" of design, which is

frequently the case in this profession. Dada was a movement that utterly rejected every convention in an effort to achieve ultimate artistic independence. With the idea of employing typography as visual aspects and shapes rather than just language, Dada had an impact on graphic design (Meggs & Purvis, 2006, p. 262). The inspiration for many logo designs that use letters to symbolise a company or product name as well as its shape came from this use of typography. The ability to use one's intuition, to visualise one's imagination, and to put that on substrate was surrealism's greatest gift to design. Designers were able to express some aspects of the environment and the human condition thanks to expressionism. The study of form and colour theory also expanded, subsequently serving as pillars of the Bauhaus movement (Meggs & Purvis, 2006, p. 266).

When World War I broke out, the art of poster design reached a pinnacle with an emphasis on activism and support for both sides. During this time, the public was introduced to two iconic images for armed forces recruitment: Alfred Leete's Great Britain counterpart urging Britons to join the country's army and James Montgomery Flagg's poster design of Uncle Sam saying, "I Want YOU" for U.S. Army recruitment. Germany produced its own posters with powerful imagery suggesting a master race. Understanding the use of propaganda in design and the significance of the graphic designer to the audience may be gained from these three poster designs. Additionally, during this time, designers were influenced by contemporary movements and used various techniques in their poster designs, including collage and cubism (Eskilson, 2007). Graphic design was substantially advanced because to Germany's superior print technology and art school institutions, and new design horizons quickly opened up, leading to these several movements.

In the Netherlands, a movement by the name of De Stijl was active in the summer of 1917. De Stijl, like many other movements, looked for general principles of harmony and balance (Meggs & Purvis, 2006, p. 299). Designers of the era split flat-colored geometric objects, typically squares or rectangles, by solid black lines to provide spatial organisation. At this time, designers also applied these ideas to typography, eliminating all curved lines and replacing them with rectangular blocks to create the letters. Additionally, sans serif fonts were primarily used. This movement was a charge forward with an implied grid and an asymmetrical balance. During this time, red was frequently used in artwork to contrast black and to represent revolution.

From 1919 through 1933, the Bauhaus was a school in Germany where cutting-edge art and design trends were studied and applied. The founder of the Bauhaus School, Walter Gropius, sought to create a new synthesis of art and technology to address the practical and aesthetic issues associated with industrialism. The Bauhaus School tried to combine art and technology to address issues that still exist in graphic design and academics today. Master, journeyman, apprentice, and an artist or artisan trained in the school workshops. Numerous techniques were created by Bauhaus, including a novel fusion of photography and typography. In poster design, these techniques were employed to magnify, distort, and highly expose photographs as well as to generate contrast with bold writing. The first issue of the Bauhaus journal was released in 1926 (Meggs & Purvis, 2006, p. 315). These publications served as a platform for disseminating concepts and methods taught at the institution. Herbert Bayer, a professor of typography at the Bauhaus School, created a global sans serif typeface during this time that was uncomplicated and obvious. He experimented with text justification and letter spacing as well as omitting capital letters (Meggs & Purvis, 2006, p. 316). In Bayer's designs, organisation and cohesion were achieved by the

employment of bars, points, and rules of vibrant colour. These strategies are still crucial for designers to comprehend since they show how emphasis and organisation may be achieved on a page without the use of graphics. Due to the emergence of the Nazi party and the start of the war, the Bauhaus school closed in 1933. A poem named "homage to gropius" below was written by Bayer in 1961:

For the future / the bauhaus gave us assurance / in facing the perplexities / of
work; / it gave us the know-how to / work, / a foundation in the crafts, / an
invaluable heritage of timeless principles / as applied to the / creative process.
/ it expressed again that we are/ not to impose aesthetics/ on the things we use,
to the structures we live in, / but that purpose and form must / be seen as one. /
that direction emerges when one / considers / concrete demands, / special
conditions, / inherent / character / of a given problem, / but never losing
perspective / that one is, after all, / an artist, / the bauhaus existed for a short /
span of time / but the potentials, / inherent in its principles / have only begun
to be realized, / its sources of design remain / forever full / of changing
possibilities (Meggs & Purvis, p. 319, 2006).

This poem eloquently describes the graphic designers' purpose charging them with the task of problem solving as well as being aesthetically careful in their work.

The general public has limited access to many innovations in modern art and Bauhaus-influenced graphic design. On a far broader scale, Jan Tschichold taught printers, typesetters, and designers how to use the skills of the day to solve simple, daily design problems (Meggs & Purvis, 2006, p. 319). In Tschichold's works, asymmetry on a page is created through typography. He emphasised the notion that there should be a dynamic force in the design, and type arrangement and alignment

should follow suit to that force. Many new typefaces that are still in use today were introduced during this time, including Gill Sans, Futura, and Times New Roman. In order to make the use of a map simpler, a new technique was developed at this time that relied more on diagrammatic interpretation than geographical accuracy. As scale and foreground and background images were experimented with, photography was used in design pieces more and more.

Many of Europe's influential designers fled to the United States as World War II broke out, bringing with them the continent's modern arts movements. Harper's Bazaar magazine covers, which used sans serif typefaces and diverse image cropping and structure, were examples of these new approaches in use. The World Geographic Atlas was released in 1953 by Bayer and his partners, who are among the most well-known designers that have immigrated from Europe. To create a thorough method of designing and graphically communicating diagrams and, most significantly, geographic locations, Bayer gathered enormous amounts of data on resources, economics, climate, and sociology (Meggs & Purvis, 2006).

In the 1950s, an important graphic design trend known as the International Typographic Style emerged. The movement's aesthetic features were the first of two key factors that made it notable. The International Typographic Style employed asymmetrical organisation on a grid that was created mathematically to create a unity of style. In contrast to the exaggerated visual elements of propaganda and commercial advertising, the style also employed objective photography and prose that portrayed these two in an understandable and accurate manner. The mentality that the movement's founders fostered was the second factor that made it so important. They described design as a crucial and socially helpful activity. Personality and eccentricity were abandoned in favour of a more global and scientific method of design and issue

resolution. The intention was to use visuals to convey significant information to various societal groups (Meggs & Purvis, 2006, p. 356). In areas where many different languages were spoken, this mindset and movement were extremely significant. Through the use of this more methodical and inclusive design approach, communication across linguistic and cultural boundaries may be possible.

Many modern typefaces that are widely used today were created during the International Typographic Style era. The twenty-one sans-serif types that made up the Univers typeface family were created by Adrian Frutiger. According to Meggs and Purvis (2006), Univers 55 was the medium basic book type, and the range included Univers 39, which was light and extra condensed, and Univers 83, which was extended and extra bold. The Haas type foundry created the Helvetica typeface in 1957 (Craig, 1999, p. 85). One of the most popular and widely used typefaces in use today is Helvetica, which has various versions, including Neue Helvetica, which was created in the 1980s. Three important fonts—Palatino, Melior, and Optima—were created during this time by renowned German typeface designer Hermann Zapf.

These typefaces were utilised at the time by graphic designers to produce a common design approach, with easily readable letters that frequently ran vertically and stood out against the background. Information was made readily available to any viewer by using a mathematical grid to arrange the type and images.

At this time, the New York School of designers was spearheading a fresh design movement in the United States. Open expression, creative approach, and uniqueness of concept were given priority in design (Meggs & Purvis, 2006, p. 374). One of the founders of this approach of fusing individual expression and resolving communication issues was Paul Rand, one of the most prominent American designers, if not the most influential. Although he also made contributions to magazine and

editorial design, Rand is best known for his logo designs. Saul Bass was a different immensely influential designer at this time. Saul Bass brought the New York School's ideas to Los Angeles, where he produced numerous iconic movie posters and imagery. To convey his ideas to the audience, Bass generally employed straightforward designs, typically with a single dominant picture (Meggs & Purvis, 2006, p. 379). Magazines and other publications were started at this time to meet the need for "well designed" American periodicals. New York Magazine and Esquire were created to complement Fortune, Vogue, and Harper's Bazaar. During this time, the renowned graphic design periodicals Print and Communication Arts were founded. These two magazines played a major role in defining the profession of graphic design and its standards even today (Meggs & Purvis, p. 388, 2006).

Paul Rand and Saul Bass were instrumental in the major corporate identity design trend. Corporate identification comprises logo design, which has gained popularity among companies as a way to quickly convey to the public who they are and leave a distinct impression on customers. To name a few, Saul Bass created logos for Continental Airlines, AT&T, Dixie, Geffen Records, Girl Scouts of the USA, Minolta, Rockwell International, United Airlines, United Way, US Postage, and Warner Communications. Paul Rand designed logos for IBM, UPS, Enron, Westinghouse, ABC, and Steve Jobs' NeXT. Chermayeff & Geismar Associates were a design firm that created logos for Chase Manhattan Bank, Mobil Oil, Time Warner, NBC, and Rockefeller Center (Meggs & Purvis, 2006).

Milton Glaser, one of the most significant poster designers, entered the scene at this period. Glaser adapted to the artistic discipline of graphic design while continuously evolving throughout his professional life. For clients like Bob Dylan, Poppy Records, and the School of Visual Arts, he created enduring posters and albums (Meggs &

Purvis, 2006). Glaser experimented with a variety of media, including silhouettes, illustration, and photography. The 1970s saw the beginning of the postmodern design trend, which is still evident in contemporary design.

The early extensions of the International Typographic Style, new-wave typography, and the exaggerated mannerism of the 1980s are the three main trends that define postmodern design (Meggs & Purvis, 2006, p. 466). During this time, the term "supergraphics" was created to describe methods used in graphic design (Meggs & Purvis, 2006, p. 467). According to Meggs & Purvis, supergraphics are large pictographs that span walls, bend corners, and extend from the floor to the ceiling as well as large Helvetica letterforms. This design strategy was intended to breathe life into a space or building that would otherwise be dull and uninspiring. Wolfgang Weingart published the magazine *Typografische Monatsblätter* in 1974. In place of the more conventional left-to-right and top-to-bottom sequencing, this magazine used a layered collage with overlapping images and arrows and numbers to direct the visitor through the page (Meggs & Purvis, 2006, p. 471). With this piece, Weingart experimented with a novel technique that used multiple film positives and stacked masks that exposed with meticulous registration to create one negative that was then sent to the printer.

Weingart advocates the "Gutenberg approach" to graphic communications, according to Meggs, who writes on page 472: "Designers, like early typographic printers, should strive to stay involved in all aspects of the process (including concept, typesetting, prepress production, and printing) to ensure the realisation of their vision." The goal and concept of this study are directly related to this quote. A retro movement was in full swing in the US at this period, with many examples in book jacket design. Retro design is related to vernacular design, which is the paraphrase of prior everyday

graphic styles from earlier decades. This is still evident now when sports teams discuss a previous decade and uniform design.

Graphic design has drastically changed in the digital age to become what it is now. When the personal computer, an Apple computer, was first introduced in the 1980s, graphic design gained a fantastic tool. A significant achievement at the time was the initial Macintosh's 72 dots per inch (dpi) graphical display. Additionally, users could interact with the computer by using the mouse. Instead of using computer programming language, the mouse allowed the user to operate creatively. Apple produced word processing, illustration, and painting applications. Early fonts were bitmapped and were managed by a dot matrix. To let printers to output text, photos, and visual components and identify their placement on the page, Adobe Systems Postscript was created (Meggs & Purvis, 2006). The 1980s and 1990s saw a revival in magazine and layout design thanks to the emergence of graphic design software like Adobe Photoshop and QuarkXPress. With the use of computers and developments in print technology, periodicals were made easier to design and create on much greater proportions. New designers emerged in the field of graphic design as a result of the expansion and accessibility of new technology. It was both a blessing and a curse that everyone could now access the resources of a graphic designer.

The general audience was inundated with images and design that was occasionally excellent and other times badly thought out. The World Wide Web was released to the public in the early 1990s, opening up a completely new market for graphic designers. The Internet provided designers with a platform to create work and instantaneously have it seen by millions of viewers. This opened up new opportunities for graphic designers in the disciplines of interaction design and web design. Additionally, there were many new typefaces available to designers. The fact that anyone could now

create fonts and upload them to the Web for use would show to have drawbacks as well. The majority of typefaces in use today are allegedly poorly conceived and little more than exact replicas of earlier fonts with minor modifications.

For a graphic designer, graphic design history is crucial. Modern design work frequently incorporates ideas, aesthetics, and methods from the past. The past also demonstrates the balance that a graphic designer has maintained between the disciplines of art and technology, acting as a sort of intermediary between the two. The graphic designer is given a library of knowledge to use and expand upon by studying previous styles and techniques. According to Paul Rand, "experience in the workplace and a thorough knowledge of one's specialization's history are indispensable" (Jupert, p. 413, 2006).

2.1.3 Graphic Design Instructional Software Used in Teaching Graphic Design

In their article "Teaching with Instructional Software" by Doering and Veletsianos from 2009, the authors first define software as another term for programmes created in programming languages. Systems software is created specifically to power computers, whereas applications software or applications programmes are produced to carry out specific activities like word processing or tutoring. Instructive software, according to Doering and Veletsianos (2009, p.76), is software created particularly to impart or support student instruction on a subject. Or to put it another way, instructional software is a term used to describe computer programmes created to offer instruction or to support the delivery of instruction on a certain subject. Software tools are used for a variety of tasks besides teaching; instructional software packages are created solely to help instruction and/or learning. Computer-assisted instruction (CAI) was the name used in the early days when educational software was primarily utilised to tutor students (Doering & Veletsianos, 2009, p.76).

Although the phrase is still frequently used, some forms of instructional software are created with more constructivist goals in mind; they serve to support instruction rather than to actually deliver it. Consequently, a lot of people think the term CAI is inaccurate and out of date. Computer-based instruction (CBI), computer-based learning (CBL), computer-assisted learning (CAL), or more general words like software learning tools may be used when referring to instructional software by teachers (Doering, & Veletsianos, 2009, p.78).

Teachers can utilise a variety of instructional software to make teaching and studying graphic design more engaging. Some of these programmes were listed in a study by Dongfang and Leizhen (2021) as photoshop, illustrator, and page maker. CorelDRAW and Flash are also mentioned by Wang (2020) as graphic design programmes utilised in educational delivery.

2.1.7.1 Adobe Photoshop

Photoshop is a very popular digital image editing programme and one of the most well-liked and effective image processing programmes available today on the Windows platform, claim Dongfang and Leizhen (2021). With the help of Photoshop, which is quite strong and offers an infinite amount of creative space, we can finally finish the effect synthesis. Photoshop includes some details, colour modification, and special effects. Photoshop is growing in popularity along with the widespread adoption of digital cameras, and as a result, its products are getting more and more customised.

2.1.7.2 Adobe Illustrator

Another type of graphics design software is called Illustrator, and it has several advantages over Photoshop in terms of vector drawing. The produced visuals can be scaled as desired without affecting their overall clarity and are capable of handling a

variety of intricate designs. The ornamental effect of the artwork produced by this graphics editing software is stronger than that of Photoshop, and the colour tone is more defined. It has a very strong sense of fashion if the colours are appropriately matched (Dongfang & Leizhen, 2021).

2.1.7.3 Pagemaker

Pagemaker is a professional typesetting programme that is cross-platform and capable of handling desktop printing. It makes use of post script page language, which not only has a powerful graphic processing function but also a powerful resolution and can successfully meet the stringent page quality standards of the printing industry. (Dongfang & Leizhen, 2021).

2.1.7.4 CorelDRAW

Wang (2020) asserts that corelDRAW software offers designers a design tool distinct from conventional typesetting painting. A graphic and picture software program called CorelDRAW was created by the Canadian business Corel. It is widely utilized in a variety of industries, including typesetting, colour separation output, model drawing, logo creation, and trademark design. It has the ability to typeset and insert graphics with ease, switch freely between different software types, realize software interaction and resource sharing, create graphic design and modelling design in a computer synchronously, synchronously design and display, and fully support the pre-press preparation and colour fidelity for the computer colour separation plate-making. The typesetting functionality of Word Office program is largely replicated in CorelDRAW software, making professional typesetting and graphic collocation easy and comfortable. A vector-based drawing program is called CorelDRAW. The vector

file contains a number of rather independent objects. Its properties can be moved and altered repeatedly without having an impact on the other objects in the drawing, allowing the designer to sketch more freely and with immediate implementation. For instance, if you want to create a plane advertisement, you need to add some decorative images, a written explanation, and graphic arrangement after importing the main image. Using CorelDRAW's Bezier curve tool, you can make any shape for your image. Each image is a cohesive whole, with lines that follow shapes or phrases that change to create dynamic creative effects. Different design strategies and effects elicit various emotions. The most recent version, CorelDRAW X8, was released in 2017 and opens huge files quickly. When compared to the lower version, the opening time has been cut in half, greatly increasing work efficiency. It is quite comparable to Photoshop in terms of the display effect, particularly the display layer, which is smooth and delicate with a genuine feeling. However, there are a few minor issues as well. For example, when exporting JPG or PDF files, the most recent action is not automatically recorded; the English font is preferred, but CorelDRAW's Chinese font selection function is more convenient. The three components of graphic design—graphics, copywriting, and color—can all be precisely represented by CorelDRAW, a program for graphic design.

2.1.7.5 Flash

Wang (2020) goes on to say that graphic design in the information age also involves web design and multimedia design. Graphic designers may create these things with ease using Flash. A popular design tool for creating online pages is Flash (interactive vector diagram and web animation standard), one of Adobe's standout offerings. The interaction between Photoshop and Flash is fairly common. Users who are adept at Photoshop will find Flash to be very user-friendly and simple to use. Flash makes it

simple to incorporate animation, music, and photos. The software's ability to liberate designers' imaginations, move past the motionless image in their heads, and stimulate their thoughts is what makes it so important. For instance, most people are unaware that you can adjust sound effects with Flash. They believe it involves using a professional mixing platform to synthesize. To change the volume and fade in and out, drag the little box in the sound option of the Frame Properties dialogue box. Flash has the advantage of allowing for the unfettered expression of animation action, flawless frame-to-frame connection, automatic generation of transition and connection images, and the ability to easily create magic action effects that are inaccessible with other web design tools. However, one drawback of Flash software is that each key frame must support each action. If a point needs to be modified, it will need to be updated significantly, and the design process could take a while. Following is the answer: Flash files can be moved between programs or customized in Photoshop without being saved first. To ensure faster playing and smaller file sizes, the files are only compressed and saved once the design is complete.

2.1.5 How Teachers Are Equipped with Graphic Software's Resource in Teaching

The level of compliance is still low since many schools, both private and public, lack computer graphic software's training courses, despite attempts to provide accessibility and practical use of facilities for computer graphic software in public schools (Goshit 2006). The difficulties integrating computer graphics software into the teaching-learning process have teachers and school officials in doubt. Lack of funding, the high cost of computer graphic software's equipment, materials, and accessories, the government paying to support the implementation of computer graphic software's policies, inadequate telephone services, improper maintenance of the damaged

equipment and facilities, and a shortage of computers are some of these issues. The lack of resources for computer graphic software in secondary schools also means that accessibility will be hampered for the sake of instructional development. This supports the findings of Fakeye (2010) and Ezeoba (2007), who discovered that primary and secondary schools lacked resources for computer graphic software.

Abdul-Salaam (2012) noted that students from the institutions he studied were unable to quickly access computer resources. The report also shows that the vast majority of secondary schools in West Africa are not connected to the internet. Those who own PCs typically lack the essential instructional programming that their kids need. Additionally, the PCs available in these schools are unable to meet the demands of the enormous population of students who attend the impacted institutions. This result is consistent with the findings of Fakeye (2010) that the majority of West African universities lack adequate IT infrastructure.

ICT as a tool for idea generation has also created a new method for designers to discuss the effects of technology, particularly during the idea development process (Appiah & Cronje, 2014). Students can fully transition into using computers as a tool for graphic design after mastering these basic processes, which would otherwise need more complex operations. It was also learned that it is the teacher's obligation to instruct the students on how to use these tools and how much practice they can get with them.

The emphasis on teacher-centered, lecture-based training is shifting to a focus on student-centered, interactive learning environments as a result of the emergence of new technologies. Fundamental, comprehensive educational reforms depend on designing and implementing effective ICT-enabled teacher education programs. In the whirlwind of rapid technological development, teacher education institutions may

either take the lead in transforming education or fall behind. Pre- and in-service teachers must be proficient in using these cutting-edge technologies for learning if education is to fully benefit from ICTs in learning. Teacher education institutions and programmes must therefore provide the leadership for pre- and in-service teachers and model the new pedagogies and tools for learning.

UNESCO (2002) states that to effectively harness the power of the new information and communication technologies (ICTs) to improve learning, the following essential conditions must be met: 1) Students and teachers must have sufficient access to digital technologies and the Internet in their classrooms, schools, and teacher education institutions. 2) High quality, meaningful, and culturally responsive digital content must be available for teachers and learners. 3) Teachers must have the knowledge and skills to use the new digital tools and resources to help all students achieve high academic standards. 4) Teacher education institutions are faced with the challenge of preparing a new generation of teachers to effectively use the new learning tools in their teaching practices. For many teacher education programmes, this daunting task requires the acquisition of new resources, expertise and careful planning.

In approaching this task UNESCO (2002) explains it is helpful to understand the following: The impact of technology on global society and the implications for education. The extensive knowledge that has been generated about how people learn and what this means for creating more effective and engaging student centered learning environments.

The stages of teacher development and the levels of adoption of ICTs by teachers.

The critical importance of context, culture, leadership and vision, lifelong learning, and the change process in planning for the integration of technology into teacher education.

The ICT competencies required of teachers related to content, pedagogy, technical issues, social issues, collaboration, and networking. The importance of developing standards to guide implementation of ICTs in teacher education.

The essential conditions for successful integration of ICTs into teacher education.

Important strategies to consider in planning for the infusion of ICTs in teacher education and managing the change process.

According to UNESCO (2002), the challenge confronting educational systems is how to transform the curriculum and teaching-learning process to provide students with the skills to function effectively in this dynamic, information-rich, and continuously changing environment. Education is at the confluence of powerful and rapidly shifting educational, technological and political forces that will shape the structure of educational systems across the globe for the remainder of this century. Many countries are engaged in a number of efforts to effect changes in the teaching/learning process to prepare students for information and technology based society. The UNESCO World Education Report (1998) notes that the new technologies challenge traditional conceptions of both teaching and learning and, by reconfiguring how teachers and learners gain access to knowledge, have the potential to transform teaching and learning processes.

ICTs provide an array of powerful tools that may help in transforming the present isolated, teacher centered and text-bound classrooms into rich, student-focused, interactive knowledge environments. To meet these challenges schools must embrace the new technologies and appropriate the new ICT tools for learning and must also move toward the goal of transforming the traditional paradigm of learning. To accomplish this goal requires both a change in the traditional view of the learning process and an understanding of how the new digital technologies can create new

learning environments in which students are engaged learners, able to take greater responsibility for their own learning and constructing their own knowledge.

2.1.6 How Graphic Design Teachers Can Incorporate Computer Software's in Their Teaching

According to Vahlensieck (2005), the evolution of technology and the introduction of the Internet have changed our workplace, our schools and our society. Not since the spread of modern industrialization has our world changed so quickly in such a short period of time. As educators, Vahlensieck cautions that we must not only react to this change but be pro-active in order to prepare our students for the emerging knowledge-based workforce and the challenges of a global economy. As a teacher, Vahlensieck believes that this requires the active use of new technology tools in the classroom. Students are naturally enthusiastic about new technology so finding ways to channel that energy into learning is a great opportunity for all teachers. However, changing familiar teaching methods can be a challenge. Vahlensieck (2005) sees the emerging technology available for teachers as a way to ignite students' curiosity and make teaching materials more engaging and effective. From Vahlensieck's findings, teachers can incorporate computers in their classroom using the following methods:

2.1.9.1 Presentation Media

The simplest and most inexpensive way to include the computer during a lesson is to gather students around the teacher's computer screen. Obviously, this approach is limited to the number of students that can see the screen. Other options are the video projector, hardware video network and classroom management software.

2.1.9.2 The Video Projector

With the help of a video projector (similar to a slide projector), a teacher can project his or her screen to the front of the classroom. Unless the projector has a high intensity light, the teacher must dim the lights in order that all the students can see the screen. The challenge is that projectors, particularly those with high intensity lights, are still very expensive. In addition, the teacher cannot monitor the student computers or direct the students' attention to the presentation, which is only possible with the hardware video network. As a teacher, Vahlensieck believes that this requires the active use of new technology tools in the classroom. Students are naturally enthusiastic about new technology so finding ways to channel that energy into learning is a great opportunity for all teachers. However, changing familiar teaching methods can be a challenge.

2.1.9.3 The Hardware Video Network

The hardware video network can transmit the teacher's screen over a cable to all the computer screens in the classroom; the teacher does not need to dim the lights for students to see the screen. However, this hardware solution is not easily moved between classrooms and its implementation costs can be high.

2.1.9.4 Classroom Management Software

Classroom management software transfers the contents of the teacher's computer screen to the student computers. Requirements for this software include an existing network, which is generally already present in school computer labs, and a high-speed connection (preferably 100 Mbps). Unlike the hardware video network, there is no need for additional cables or wires. Classroom management software has the further advantage that it is independent of the light quality and the arrangement of the student computers. Students who sit in the back of the class have the same view as those sitting in the front and the teacher can use additional software features for an

interactive lesson which goes beyond simple screen sharing. This software represents one of the most modern and, at the same time, extremely low-priced solutions and is the preferred method. Today's standard for classroom management software is Vision from Geneva Logic. The practical example in this brochure uses this program and the additional tool, Pointer.

2.1.7 Impact of Graphic Design Software's Integration on Students' Motivation to Study Graphic Design

Computer technology in Graphic Design has therefore become such an important and an imperative item for designers. Yeoh (2002) affirmed in his study that in Graphic Design, computer technology has become an ideation and production tool. To be competent in the use of ICT for the many tasks that need to be accomplished in the profession is very key. Yeoh's study revealed that, students have shifted from the traditional way of conceiving and creating ideas to the use of technology for idea generation processes. Appiah and Cronjé (2013) also asserted that, the teaching and learning of Graphic Design has also been affected by the technological modifications, resulting in the introduction of ICT, especially in the developing economies. They also affirm that the introduction of technology into Graphic Design education introduces a unique problem in relation to the pedagogy of ideation and call for a review of pedagogy for design education in the area of ideation. Yeoh (2002) earlier in his study, observed that the syllabus for design in the study he conducted was structured to include practical base activity, which is executed effectively with the use of technology, from the idea development to the final execution of a design solution. With the design profession having been expanded to include technology and currently used to portray a profession of wide based of actions students therefore might require the training of the use of technology at an early stage.

Literature supports the view that Graphic Design consists of complex decision making in idea development which helps solve design problems (Dorst & Cross, 2001; Dorst, 2006).

A survey by Ametordzi, Osei-Poku & Eshun (2012) revealed that Art is essential, especially when it functions as a tool to communicate ideas to people. The significance of Art and design contributions into the society and the global world led the educational policy makers in Ghana to introduce Visual Art at all levels. It included the introduction of Basic Design and Technology (BDT) in the Junior High Schools and, visual art programme in the second cycle school in 1991. The programme aimed among other things, to give the young ones (Pupils and students) a strong foundation in creativity and to help develop in them, the spirit of innovation, resourcefulness and creativity (Curriculum Research Development Division, 2008). In reference to the SHS Graphic Design Syllabus, Graphic Design is a facet of the Visual Arts curriculum sought after in Senior High Schools throughout Ghana. The introduction of ICT in the Graphic Design syllabus at this level focuses on developing computer skills in assessing information, ideas and designing graphic communication media (Curriculum Research Development Division, 2008).

Information and communication technologies (ICT) have become indispensable tools in today's information age, making a dramatic impact on the lives of people globally. This effect is most significant in education. Research has revealed that ICT has also motivate and improved learning outcomes (Yeoh, 2002; Appiah & Cronje, 2014). It has also been proved by researches on the benefits that is achieved by students, instructors and administration with the use if ICT in Graphic Design and communication of basic idea in development.

2.1.11 Barriers to the Use of Computer Graphic Design by Teachers and Students in the Teaching and Learning of Graphic Design

The act of integrating ICT into teaching and learning is a complex process and one that may encounter a number of difficulties. These difficulties are known as “barriers” (Schoepp, 2005). A barrier is defined as “any condition that makes it difficult to make progress or to achieve an objective” (WordNet, 1997, as cited in Schoepp, 2005, p. 2). Information and Communication technology (ICT) is very important, and plays a major role in teaching and learning process with enormous benefits. In spite of all these benefits however ICT have not been effectively integrated and incorporated into teaching of Graphic Design especially computer Graphic Design in senior high schools in Ghana. Many factors have been identified and attributed to this. The aim of the researcher is to see if the outcome of this study would be consistent with these identified factors.

Some teachers at all levels of pre-tertiary level of education do not regard computers and its related technologies to be of any importance to their teaching and learning process. BECTA (2004) identified this barrier in their review on factors hindering the use of ICT in instruction.

Attitude of teachers: Teacher’s attitudes are major factor to the use of technology in instruction. Negative attitude would discourage him from integrating it into teaching. Researches have established that some teachers especially pre-tertiary level are not easily adaptable to new trends of doing things because they simple want to continue with old method where they feel more comfortable. Teachers do not know and aware of what the change can offer them so they prefer sticking to their traditional methods of instruction.

Teachers' training: teachers and instructors do not have the basic requisite knowledge training to be able to use technology in their instruction. Guha in BECTA (2004) pointed that time and training are major obstacles to technology usage in teaching. Many teacher training colleges do not prepare and teach teachers to have basic skills enable them incorporate technology in their instruction. Committing time and resources into self-training in order to use ICT in preparation of lesson becomes difficult (Bello, 2012).

Organizational Attitude: The school or institution in which one works can affect his or her interest or motivation to use technology in instruction. Ayo (2001) stated that teachers cannot effectively use technology if they lack basic training, support and time. If all these factors are available, it is more likely for teachers to incorporated technology into instruction.

Access to technology: Studies have revealed that many classrooms in the United States and UK have computers and other technologies. Green (2006) reported that Apple Classroom of Tomorrow was set up by Apple Computers in 1985 and their countless examples in Europe. The situation is different in Ghana. Green (2006) stated that access “involves locating the proper amount and right types of technology where teachers and students can effectively use them”. When Graphic Design software are available in the art studio would be able to locate relevant materials that could use for their lesson.

Cost: One major factor to the use of technology is the cost of procuring technology. Hardware, software, installation internet, maintenance required money. Approved computer few charged by the schools would not be sufficient to have any proper ICT facilities and technology. Coskun and Kinnisnet (2009) said \$10 million is spent on

classroom computers in New Jersey. Not many schools if any can spend such amount on computers alone in Ghana.

Learners' technology skill: Student's knowledge and ability level in the use of technology constitute an obstacle. Studies show that many students living in the rural areas lack exposure to computers and its related technology hence teachers do not see the need to use the technology since the students have to be trained before it can be used in the actual instruction. The Scottish HM Inspectorate of Education (2004:3) noted that "the pupils' ICT skills should complement pupils' ICT-based coursework in a wide range of subjects". Also, Balanskat et al. (2006) divided them into micro level barriers, including those related to teachers' attitudes and approach to ICT, and meso level barriers, including those related to the institutional context. The latter added a third category called macro level (system-level barriers), including those related to the wider educational framework. Another perspective presents the obstacles as pertaining to two kinds of conditions: material and nonmaterial (Pelgrum, 2001). The material conditions may be the insufficient number of computers or copies of software. The non-material obstacles include teachers' insufficient ICT knowledge and skills, the difficulty of integrating ICT in instruction, and insufficient teacher time.

The expenses of computers have risen significantly over time, according to Tayo, Ajibade, and Ojedokun (2009) while analyzing the obstacles to computer use in Nigerian secondary school classrooms. This has prevented the majority of Nigerian secondary schools from implementing computers for teaching purposes. This is accompanied by the excessive cost of software, which has a similar trend to hardware pricing. The expenditures of maintenance and repair are inescapable if attempts were made to purchase computers for educational purposes.

Another barrier that the authors found was the attitude of resistance to change among Nigerian teachers, who saw the use of computers in the classroom as a threat to their beloved careers rather than as a tool to enhance teaching and learning. The prayer for the early demise of computer education stems from the fact that the teachers also saw the use of computers as an increase in their workload in the classroom without enough recompense.

Poor technical progress in Nigeria is a problem that is closely tied to resistance to change. Tayo et al. (2009) regret the dearth of classroom resources that hinder computer teaching in schools. This is a result of the lack of amenities like air conditioning, a suitable computer environment, and structures. In addition, the main source of power for the computer, electricity, was unstable. Additionally, they describe an epileptic power supply and continuous power spikes that harm the computer system.

Besides, the cost of generators which could provide alternative power to use the computers were skyrocketing. Coupled with this, was the exorbitant cost of maintaining and using the computers for problem solving and information storage. These are problems which could deter anyone from using computers in the classroom. Technology use in the classroom can be categorized along a continuum of instructional techniques, from instruction to construction, according to Dexter, Anderson, and Becker (1999). They clarify that in terms of instruction, teachers run teacher-centered classrooms, teach students procedural skills and facts, and incorporate technology as a complement to this approach, primarily using it for drill and practice. Teachers encourage active learning by utilizing tools, software, and information technology in construction or student-centered classrooms. The technology supports the active learning; it becomes a tool with which the students

may construct knowledge. Dexter et al indicate that teacher's predisposition to the change in technology is a factor that speeds up or slows down the inevitable reaction that occurs when technology is present as a catalyst of reform.

The graphic design profession, like all other areas of the larger publishing industry, is undergoing significant changes and facing enormous challenges as a result of the usage of electronic media, claims Mellroy (2009). Since the laws are still being set, people are just starting to consider what will define effective graphic design in this new digital media era. Some detest and fear such changes, while others embrace them and thrive on the new world that awaits them. This shows that there are a variety of difficulties that the incorporation of computers into the teaching and learning process will face. The difficulties begin with the high price of purchasing a computer and its accessories, their maintenance and repair combined with erratic power supply and attitude of personnel handling of the instructional skills for the Graphic Design students to benefit from the teachers and to be up to date with technology.

2.2 Empirical Review

The works of other researchers that are relevant to the current study are reviewed in this section. The section examines the works of Toffah, Appiah and Boamah (2021), Yeoh (2002), Adii and Ibiwoye (2017), Ting (2020) and Sebbeth (2017). This made it possible for the researcher to connect the findings of this study to those of earlier ones.

A study conducted by Toffah, Appiah and Boamah (2021), sought to analyse the use of ICT in idea development in the design process with respect to graphic design education in the second cycle institution. The focus was to examine the effect of the

introduction of ICT into the curriculum of graphic design education in the Senior High Schools (SHS) on idea development. Quantitatively, data was gathered from two hundred and twenty students from four different SHS in Kumasi, where graphic design is pursued as an elective course in visual art. There was evidence to suggest that even though ICT as a tool is studied in schools, design students were not officially allowed to either assess the internet or use the computer for idea development. However, there were evidence to suggest that students mostly assess the internet and use the computer for their assignments in their respective homes. The results also affirmed that ICT helped in their idea development even though per the pedagogy, teachers do not teach the students. The study however recommended that curriculum developers take another look at the curriculum in shaping the thoughts of these students since the early and proper use of ICT by design students will help in the thinking on the use of technology in the higher education institutions. Moreover, it will also help in the realization of their full potential of technology in idea development in the design process, especially in developing countries.

Another study by Yeoh (2002), investigated the impact of computer technology on the design process of ideation in undergraduate graphic design students. The study was conducted by using a set of questionnaires responded to by sixty-eight undergraduate students from fourteen graphic design classes in a major university in Southwest United States. The study revealed that computer plays a formative role in graphic design students' repertoire especially when it can affect the outcome of their final designs. An overwhelming 91% of all respondents in this study report that they discover something new while working on the computer. Their justifications were based on the fact that computer technology is facilitative and their dependencies are more or less in the ways of using the computer as tools of automation, accuracy,

expediency, presentation, execution, and implementation. What was discovered was that they made unintentional discoveries when using the computer, which in turn evoked new responses and stimulated new thinking. It was more than a tool because it helped to make the respondents' minds work and it enhanced their creativity. The phenomenon which emerged from the study alluded to the fact that computer technology inspired and developed new applications in its users. It was concluded in the study that the computer, as an "actual intelligence," was the means for augmenting human problem-solving. The secret to deriving solutions which assisted human in problem-solving was to provide the right toolkit—the computer, which was designed to complement human infallibilities.

Again, a study by Adiji and Ibiwoye (2017), also investigated the effects of graphics and Computer Aided Design Software on the production of embroidered clothing in South Western Nigeria. Questionnaires were the main research instrument used to collect data from respondents. Responses were analysed using SPSS. The study findings revealed that computer graphics had influence on the practice of embroidery. The result further shows that embroiderers believe that Computer Aided Designs (CADs) usage in their design process will make their work less cumbersome and increase patronage of their embroidery. The study finally recommended that there must be sizeable number of embroiderers who have been trained in the use of CADs to make their design. The embroiderers could also employ the services of trained Designers/Artists to help in drawing out the patterns before transferring them on the textile garment.

Furthermore, Wang (2020) also conducted a study to examine some graphic art design based on computer graphics software in China. The study used questionnaires to gather data from respondents. The data were analysed into frequencies, percentages

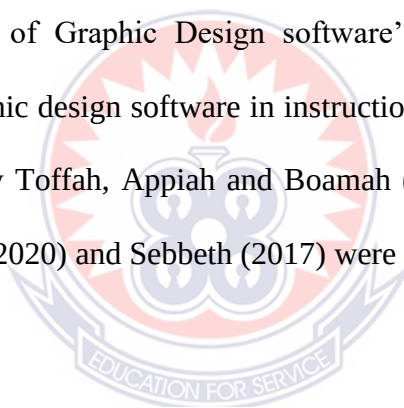
and charts. The results found out that CorelDRAW, photoshop and flash were the most commonly used design software in China.

Finally, Sebbeth (2017) study analysed the Significance of introducing computer graphics into the Senior High School Visual Arts Programme in Ghana. Five hundred students drawn from ten schools were selected from five regions in Ghana to be trained in computer programmes or software that could be taught in schools. The observation method was used to gather data for this research while the purposive sampling technique was employed to select the population for the study. This was generally based on the researcher's previous knowledge of the schools that motivated his choice of the schools for the training in the selected computer programmes that could be used in schools. As such the researcher used his personal judgment to select the sample population which was Senior High Schools that offer graphic design and had computer laboratories at the same time. The selected students were assigned learning tasks involving the use of computers in designing while the researcher and the Information Technology teachers of the selected schools observed and gave directives. The outcome of the observation showed that the rate at which students could adapt to new learning techniques of using the computer in designing during the short period of training, attest to the fact that when computer graphics is given ample time on the time table, students will produce marvelous graphic design works.

To sum up, each of the aforementioned research was carried out in a unique geographic setting with a distinct population. The current study, which was carried out in senior high schools in the Agona East District of Ghana aimed to compare or contrast the results of the studies mentioned above.

2.3 Summary of Literature Review

Chapter two reviewed concepts and other studies related to the graphic design software used in instructional delivery in senior high schools in the Agona East District of Ghana. Issues such as the overview of graphic design, history of graphic design, graphic design instructional software used in teaching graphic design, how teachers introduce graphic design software's to SHS students, how teachers are equipped with Graphic software's resource in teaching, how graphic design teachers can incorporate computer software's in their Teaching, impact of graphic design software's integration on Visual Art SHS students' motivation to study Graphic Design, barriers to the use of computer graphic design by teachers and students in the teaching and learning of Graphic Design software's and solutions to challenges involved in using graphic design software in instructional delivery were re-examined. Finally, works done by Toffah, Appiah and Boamah (2021), Yeoh (2002), Adii and Ibiwoye (2017), Ting (2020) and Sebbeth (2017) were thoroughly examine.



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the methods for data collection and procedures that were followed to conduct the research. It includes research design, study population, sample and sampling procedure, data collection instruments and techniques, sampling techniques and procedure used in collecting data for the study.

3.1 Research Approach

The present study incorporates the quantitative research approach. According to Slevitch (2011), quantitative research evaluates data to produce numerical information or information that can be changed into usable figures and numbers. It uses well-defined quantifiable variables in which the result can be generalized into a bigger and wider populace. The method also uses measurable data to formulate facts, ideas and uncertainties. Various forms of surveys techniques can be used to gather and collect data under this approach. The main goal of quantitative research and/or methods is to determine whether the predictive generalizations of a theory or hypotheses hold true or false. Daniel (2016) similarly argues that quantitative research is based primarily on deductive logical thinking wherein theories and hypotheses are tested in a cause-effect order; the main reason being to develop generalizations that contribute to theory development that can enable the researcher to understand some phenomenon being studied.

3.2 Research Design

A research design is a strategy that justifies the methods employed in a study and how those methods relate to the research questions and objectives (Jupp, 2011). Therefore, the descriptive survey research design was employed in the study. Descriptive survey research refers to those studies which aim at collecting data and describing systematically the characteristics, features or facts about a given population. According to Leedy and Omrod (2019), it is a blueprint which outlines how data concerning a naturally occurring phenomenon must be collected and analyzed. Davis (2021) also stated that descriptive research involves the identification of attributes of a particular phenomenon based on an observational basis or the exploration of the correlation between two or more phenomena. According to McCombes (2019), this design aims to accurately and systematically describe a population, situation or phenomenon. The adoption of this design was deemed appropriate as the study aims at describing graphic design software used in instructional delivery in senior high schools in Agona East District.

3.3 Study Population

In every study, a researcher always has an interest in a group of people from whom he/she gathers data and draws conclusion. The larger interest group which one hopes to apply the results of a study is the population (Fraenkel & Wallen, 2006). According to Leedy and Omrod (2019), population is the total number of individual entities within the target group about which the researcher is interested in gaining information and drawing a conclusion. Johnson and Christensen (2012) are of the view that population is the large group to which the researcher wants to generalise the sample results, the total group that one is interested in. Therefore, the study population was made up of teachers and students in Swedru SHSs and Nsaba Presbyterian SHS. Also,

the target and accessible population were visual arts teachers and students of the school. Teachers and students were chosen for the study because the topic under study is graphic design software used in instructional delivery. As a result, teachers and students were in the best position to provide the researcher with the data needed to conduct the study. Again, the selected schools were chosen because of proximity to the researcher.

3.4 Sample and Sampling Procedures

Lokesh (1997) as cited in Puwurrayire (2010), defines sampling as the process by which a relatively small number of individuals or measure of individuals, objects or events are selected and analyzed in order to find out something about the entire population from which it was selected. After deciding on the sample, researchers try as much as possible to, in most instances, obtain a sample that is representative of the population of interest that means they prefer random sampling. According to Sidhu (2003) as cited in Puwurrayire (2010), sampling is the process of selecting a representative unit from a population. Similarly, Cohen and Manion (1994) explain that in sampling, the researcher endeavours to collect information from smaller group or subsets of the population in such a way that the knowledge gained is representative of the total population under study.

From the above definitions, sample size can therefore be defined as a subset or representative of the population such that important characteristics like age, gender, and status are distributed similarly in the group (Creswell & Hirose, 2019). Also, Creswell (2014) contends that a sample represents the selected participants from the population who partake in the study. Given this, the sample size for the study was made up of 6 teachers and 285 students totalling 291. The sample size for the students and teachers was determined by the intuitive method of sample size determination in

Table 2 below. With the intuitive method of sample size determination, the researcher intuitively determined percentages for the sampling frame of each selected school as the population in the two schools were not evenly distributed.

Table 2: Distribution of Respondents by Schools

Name of School	Population	Sampling Frame	Percentage (%)	Sample Size	Total
Swedru SHS	Students	210	73.8	155	285
Nsaba Presbyterian SHS		170	76.5	130	
Swedru SHS	Teachers	4	100	4	6
Nsaba Presbyterian SHS		2	100	2	
Total					291

Source: Field Survey (2023)

The sampling technique adopted in this study is the multi-stage sampling technique which included purposive sampling, simple random sampling and a census. At the initial stage, purposive sampling was used to select visual arts teachers and students who have experienced Graphic Design software's mediated instruction in Graphic Design. According to Kelly (2010), purposive sampling is 'used to select respondents that are most likely to yield appropriate and useful information' and is a way of identifying and selecting cases that will use limited research resources effectively (Palinkas et al., 2015). However, at the final stage, a simple random sampling technique and census were used. According to Taherdoost, (2016), the simple random technique is a sampling technique where all people are believed to have the potential to participate as a study sample. Census on the other hand refers to an attempt made to collect data from every member of a population rather than choosing a sample is

referred to as census (Harding ,2013). Bhanu (2011) held the view that however accurately a sample from a population may be generated, there will always be margin for error, whereas in the case of census, whole population is considered and as such it is most accurate.

The simple random sampling was used to select 285 students from the entire visual arts students' population of 1100 students whereas census was used to sample all the 6 teachers. Also, the simple random sampling technique was adopted to ensure participants have an equal chance to participate in the study, which would reduce selection bias during selection (Taherdoost, 2016). The sample size was determined using the Krejcie and Morgan sample size determination table as cited in Kuforiji, Egwakhe & Binuyo (2019).

3.5 Research Instrument

The main data collection instrument used in the study is a questionnaire. A questionnaire is an instrument in which respondents provide written responses to questions or mark items that indicate their responses. Kothari and Garg (2014) clarify that a questionnaire consists of some questions printed or typed in a definite order on a form or set of forms for participants to answer on a particular topic. Creswell and Hirose (2019) also assert that questionnaires are usually used in asking people questions to find out what they think about something or what people know about an issue. Leedy and Omrod (2019) view questionnaires as questions respondents are made to supply answers or tick answers that are provided. The researcher used a questionnaire because it promises a wider coverage since the researcher could approach respondents more easily and could be completed at the respondents' convenience. Closed-ended questions were used to design the questionnaire. The closed-ended questions were designed to elicit specific information from the

respondents. The questionnaire consisted of four sections, that is, A to D. Section A dealt with the background information of the respondents while sections B to D focused on the responses based on the research questions that guided the study.

3.6 Data Collection Procedure

First, the questionnaire was piloted in a school which has similar characteristics to the selected school to evaluate its efficacy in terms of validity and reliability. The validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure (Robson, 2011). In other words, it is the degree to which a study tool measures what it purports to measure. Validity aims to ensure that there are no systematic sampling errors, which mainly occur when some populations' characteristics are under-represented or over-represented (Verhoeven, 2011). A research instrument is valid if its content is relevant and appropriate to research objectives. Reliability on the other hand is the extent to which measurements are repeatable when different people measure different occasions, under different conditions, supposedly with alternative instruments which measure the construct or skill (Drost, 2011).

Also, on the day of arriving at the school under study, the researcher obtained permission from the academic head of the schools to administer the questionnaire in the school. Before the teachers and students started to fill out the questionnaire, the researcher gave detailed instructions and the students were allowed to ask questions in the process in case they did not understand something. The respondents were also assured that all the results of the study would be applied to research work only and that, their responses would have nothing to do with their teachers' evaluation of them. Respondents were given thirty (30) minutes to fill out the questionnaires and the questionnaires were taken immediately after completion.

3.7 Methods of Data Analysis

According to Burns and Grove (2011) data analysis refers to the reduction and displaying of the data, verification and drawing of conclusions. The purpose of data analysis is to organize, provide structure to, and elicit meaning from research data. Therefore, the data collected was edited to check the completeness and accuracy of filling responses. SPSS (Statistical Package for the Social Sciences) version 23.0 was used to analyse the data. The data were transformed into descriptive statistics based on the objectives of the study. The descriptive statistics ensured the comparison of frequencies and percentages and mean deviation of various responses. Finally, inferences were drawn from the frequency tables, percentages, standard deviations and the results.

3.8 Limitations of the Study

Limitations of a research are the influences or factors that the researcher cannot control that place restrictions on the methodology (Simon. 2011). Like any other research, this study also had its own limitations. A limiting factor was inability of the researcher to employ multiple instruments to collect varied data from the respondents. The use of only questionnaire limited the extent that the respondents responded to the items. Time restriction along with the researcher's hectic job schedule were another restricting issues. The researcher's busy job schedule hampered early completion of the study because he is both a worker and a student. Finally, the study should have covered a number of public senior high schools in the district and beyond. Therefore, focusing solely on Swedru SHS and Agona Presbyterian SHS in Agona East District means the researcher could not generalize beyond the study area.

3.9 Ethical Consideration

In conformity with ethical considerations, the researcher obtained a letter of introduction from the University of Education, Winneba to verify compliance with regulatory requirements. The researcher was able to obtain a research permit from the University of Education's Ethics Review Board with the help of the introduction letter. The obtained permit was delivered to the municipal education office of Agona East to get a letter of clearance for the collection of data from the selected schools. Data collection started after a prior visit to the schools when rapport had been established with both students and teachers. The respondents were guaranteed complete anonymity and secrecy to uphold ethical considerations. Respondents were given the assurance that they have the freedom to leave the data-gathering process at any time and without repercussions. The researcher cited all of the information's sources, including books, peer-reviewed journal articles, theses that have been published and unpublished, as well as other study materials, to respect copyrights and avoid plagiarism.

3.10 Summary of Research Methodology

The methodology focused on the research design used in the study which was the descriptive research design. The target population was 285 students and 6 teachers in Swedru SHS and Nsaba Presbyterian SHS. Multi-staged sampling involving purposive sampling, simple random sampling technique and census were adopted and a questionnaire was used to gather data from respondents. On the collection of data, permission was sought from the managements of Swedru SHS and Nsaba Presbyterian SHS to administer the questionnaire. Statistical Package for the Social Sciences (version 23.0) was used to analyse data into frequencies, percentages and standard deviations.

CHAPTER FOUR

RESULTS AND FINDINGS

4.0 Introduction

This chapter presents analysis and interpretation of results and the findings that emanated from study. The analysis and interpretations are based on background information of participants and the main research questions that guide the study. Responses of respondents on some graphic design software used in teaching graphic design, barriers to the use of graphic design software in instructional delivery and effects of computer design software on the learning of graphic design in senior high schools at Agona East District are analysed and discussed. Thus, the chapter is subdivided into two sections. The first section deals with the background information of participants whereas the second part deals with the findings that emanated from the study.

4.1 Background Information of Participants

This section presents information on the background of participants who are also students and teachers of Swedru SHS and Nsaba Presbyterian SHS in the Agona East District. The characteristics of the respondents which are discussed in this section include gender, age, form or class, school, educational qualification and years of teaching experience. Table 3 below shows the background information of teachers.

Table 3: Background Information of Teachers (N=6)

Background Information	Frequency (N)	Percentage (%)
Gender		
Male	5	83.3
Female	1	16.7

Educational Qualification		
Diploma	0	0.0
Undergraduate Degree	4	66.7
Masters Degree	2	33.3
Years of Teaching Experience		
Less than 5 years	2	33.3
Between 5 and 10 years	3	50.0
Between 10 and 15 years	1	16.7
Between 15 years and above	0	0.0

Source: Field Data (2023)

Results in table 3 also show teachers gender, educational qualification and years of teaching experience. The results revealed that 56(83.3%) of the teachers who took part in the study were males whilst 1(16.7%) were females. These results show that more male teachers participated in the study than their female counterpart. Again, on their educational qualification, the results showed that majority of the teachers 4(66.7%) were undergraduate degree holders with only a few 2(33.3%) holding master's degree. However, none of them was a diploma certificate holder. This means majority of the teachers have the minimum qualification required to teach in senior high school. Finally, the results revealed that 2(33.3%) of the teachers have less than 5 years working experience, 3(50.0%) have between 5- and 10-years teaching experience and 1(16.7%) having between 10- and 15-years teaching experience. However, none of them has teaching experience between 15 years and above. The results show that majority of teachers' respondents have between 5- and 10-years

teaching experience. This also implies that, majority of them possess some basic skills acquired through experience in their field studies.

Table 4: Background Information of Students (N=285)

Background Information	Frequency (N)	Percentage (%)
Gender		
Male	186	65.2
Female	99	34.7
Age		
12-14 years	51	17.9
15-17 years	83	29.1
18 years and above	151	53.0
Class/Form		
Form 1	82	28.8
Form 2	93	32.6
Form 3	110	38.6
School		
Swedru SHS	155	54.4
Nsaba Presbyterian SHS	130	45.6

Source: Field Data (2023)

Results in table 4 above also show the gender, age, class/form and school of the students' respondents. The results showed that out of the 285 visual arts students who took part in the study, 186(65.2%) were males whereas 99(34.7%) were females. This shows that majority of the students' respondents were males. This may be explained by the fact that, many girls at the senior high schools are not interested in the subject

because of the nature of it. Again, in terms of age, majority of them 151(53.0%) were aged 18 years and above, with few of them 83(29.1%) and 51(17.9%) aged 15-17 years and 12-14 years respectively. In addition, the results showed that majority of the students 110(38.6%) who participated in the study were in form 3, whilst 93(32.6%) and 82(28.8%) were in form 2 and form 1 respectively. Finally, the results in table 4 revealed that, majority of the students 155(54.4%) were students of Swedru SHS whilst few of them were 130(45.6%) selected from Nsaba Presbyterian SHS.

4.2 Analysis of Results and Findings

This section deals with the presentation of results and the major findings that emerged from the study. The results are organized and discussed in accordance with each research question.

4.2.1 What are Some of the Graphic Design Software Used in Teaching

Graphic Design in the Senior High Schools?

This section identifies some of the graphic design software used in teaching graphic design in the senior high schools under study. The results are presented in table 4 below;

Table 5: Some Graphic Design Software Used in Teaching Graphic Design in The Senior High Schools.

Teachers' Responses (N=6)

Statements	VO (5)	O (4)	S (3)	N (2)
I use CorelDRAW graphics to draw vector graph images during graphic design instruction	4 (66.7)	1 (16.7)	1 (16.7)	0 (0.0)
I use Adobe Photoshop to guide students to design logos during graphic design instruction	3 (50.0)	2 (33.3)	1 (16.7)	0 (0)
I use Adobe Flash software to support audio, animation, etc. when teaching graphic design	0 (0.0)	2 (33.3)	1 (16.7)	3 (50.0)

I use Adobe Illustrator to teach students during graphic design period	0 (0.0)	1 (16.7)	2 (33.3)	3 (50.0)
I use Mega Creator to build catchy graphics to teach students	0 (0.0)	0 (0.0)	1 (16.7)	5 (83.3)

Source: Field Data (2023)

Percentages are in parenthesis

Scale: Very Often (VO), Often (O), Sometimes (S), Never (N)

The results presented in Table 5 above shows teachers' responses on some graphic design software used in teaching graphic design. From the results, 5(83.3%) of the teachers confirmed they very often or often use CorelDRAW graphic to draw vector graph images during graphic design instruction whilst 1(16.7%) said they sometimes or never use CorelDRAW graphic to draw vector graph images during graphic design instruction. This result shows that majority of the visual arts teachers who took part in the study very often use CorelDRAW graphic to draw vector graph images during graphic design instruction, implying that CorelDRAW is among the most commonly used graphic design software in the study areas. Again, results from table 4 showed that majority of the teachers 5(83.3%) very often or often use Adobe Photoshop to guide students to design logos during graphic design instruction whereas few of them 1(16.7%) sometimes or never use Adobe Photoshop to guide students to design logos during graphic design instruction. This also indicates that Adobe Photoshop is one of the common graphic design software teachers use to teach graphic design in the study areas. In addition, the results revealed that few of the teachers 2(33.3%) said they very often or often use Adobe Flash software to support audio, animation, etc. when teaching graphic design. However, majority of them 5(83.3%) confirmed they sometimes or never use Adobe Flash software to support audio, animation, etc. when teaching graphic design. This implies that Adobe Flash software is not commonly

used in Swedru SHS and Nsaba Presbyterian SHS. Last but not least, few of the teachers 1(16.7%) mentioned that they very often or often use Adobe Illustrator to teach students during graphic design period whereas majority of them 5(83.3%) said they sometimes or never use Adobe Illustrator to teach students during graphic design period indicating that Adobe Illustrator is not one of the commonly used graphic design software in the study area. Finally, the results indicated that none of the teachers said they very often or often use Mega Creator to build catchy graphics to teach students. However, the results showed that all the teachers 6(100.0%) said they sometimes or never use Mega Creator to build catchy graphics to teach students graphic design, implying that Mega Creator is not a commonly used graphic design software in the senior high schools understudy.

In summary, analysis of results in table 5 has showed that, CorelDRAW and Adobe Photoshop are the graphic design software that are commonly used at Swedru SHS and Nsaba Presbyterian SHS. According to Dongfang and Leizhen (2021), teachers can utilise a variety of instructional software to make teaching and studying graphic design more engaging. Some of these instructional softwares include photoshop, illustrator, and page maker (Dongfang & Leizhen, 2021). Dongfang and Leizhen emphasize that, with the help of Photoshop, which is quite strong and offers an infinite amount of creative space, a teacher can finally finish the effect synthesis. Photoshop includes some details, colour modification, and special effects. The findings from the study is in line with Wang (2020)'s study which found out that, CorelDRAW, Photoshop and Flash are the basic graphic design softwares that can be used to teach graphic design. Wang (2020) states that, the corelDRAW software offers teachers and designers a design tool distinct from conventional typesetting painting. He further asserts that, with CorelDRAW's Bezier curve tool, one can make

any shape for his image. Each image is a cohesive whole, with lines that follow shapes or phrases that change to create dynamic creative effects.

4.2.2 What Are the Barriers to the Use of Graphic Design Software in Instructional Delivery in the Senior High Schools?

This section discusses the barriers to the use of graphic design software in instructional delivery in senior high schools. The results are presented in Table 5 below:

Table 6: Barriers to The Use of Graphic Design Software in Instructional Delivery in Senior High Schools

Teachers' Responses

Statements	SA (5)	A (4)	N (3)	D (2)	SD (1)
Time does not permit the use of computers and computer software in graphic design instruction	2 (33.3)	3 (50.0)	0 (0.0)	1 (16.7)	0 (0.0)
Teachers lack basic training in the use of computers and computer software	3 (50.0)	1 (16.7)	0 (0.0)	1 (16.7)	1 (16.7)
Inadequate computers in the school hamper the use of graphic design software in teaching	4 (66.7)	2 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)
Large class size affects the use of graphic design software in instructional delivery	0 (0.0)	1 (16.7)	0 (0.0)	2 (33.3)	3 (50.0)
Students do not show interest in lesson when computers are used in teaching them.	0 (0.0)	0 (0.0)	0 (0.0)	4 (66.7)	2 (33.3)

Source: Field Data (2023)

Percentages are in parenthesis

Scale: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)

Table 6 above presents results on the barriers to the use of graphic design software in instructional delivery in senior high schools at Agona East District. The results showed that majority of the teachers 5(83.3%) agree or strongly agree that time does not permit the use of computers and computer software in graphic design instruction whilst few of them 1(16.7%) disagree or strongly disagree. This indicates that one of the many barriers to the use of graphic design software in instructional delivery in the study areas is time constraint. From table 6, it was revealed again that majority of the teachers 4(66.7%) agree or strongly agree teachers lack basic training in the use of computers and computer software. However, few of them 2(33.3%) disagree or strongly disagree to the assertion. This implies that lack of basic training on the part of teachers is one of the challenges to use of graphic design software in the senior high schools understudy. Again, the results revealed that all the teachers 6(100.0%) agree or strongly agree that inadequate computers in the school hamper the use of graphic design software in teaching whilst none of them disagree or strongly disagree. This also means inadequate computers in the schools hamper the use of graphic design software. The results further indicated that few of the teachers 1(16.7%) agree or strongly agree that large class size affects the use of graphic design software in instructional delivery with the majority of them 5(83.3%) either disagreeing or strongly disagreeing. This means class size does not pose any barrier to the use of graphic design software. Finally, none of the teachers agree or strongly agree that students do not show interest in lesson when computers are used in teaching them. However, all the teachers disagree or strongly disagree to the statement. It could be deduced from this result that, students interest in graphic design is not affected negatively when computers are used in lesson delivery.

To conclude, the results has shown that major barriers to graphic design software application in instructional delivery are time constraint, lack of basic training for teachers and inadequate computers for both teachers and students. About the issue of time constraint, Guha in BECTA (2004) pointed out that, time and training are major obstacles to technology usage in teaching. Many teacher training colleges do not prepare and teach teachers to have basic skills to enable them incorporate technology in their instruction. Bello (2012) also adds that, committing time and resources into self-training in order to use ICT in preparation of lesson is difficult. On the lack of basic training for teachers, Guha in BECTA (2004) supports that training is a major obstacle to technology usage in teaching. This is because, committing time and resources into self-training in order to use ICT in preparation of lesson is very difficult (Bello, 2012). Ayo (2001) reiterates that teachers cannot effectively use technology if they lack basic training, support and time. If all these factors are available, it is more likely for teachers to incorporated technology into instruction. Pelgrum (2001) also supports the inadequacy of computers as a major barrier to the use of computers in graphic design instruction. According to him, the barriers to the use of ICT in instruction pertains to two kinds of conditions: material and nonmaterial. Pelgrum (2001) mentions insufficient number of computers or copies of software as a material condition which prevents the use of ICT in teaching graphic design. This study finding is also in consonance with the study by Tayo, Ajibade, and Ojedokun (2009) which sought to analyse obstacles to computer use in Nigerian secondary school classrooms and found out that, expenses of computers have risen significantly over time. This has prevented the majority of Nigerian secondary schools from implementing computers for teaching purposes. This is accompanied by the excessive cost of software, which has a similar trend to hardware pricing. The

expenditures of maintenance and repair are inescapable if attempts were made to purchase computers for educational purposes, hence implementing computers in teaching has become very difficult.

4.2.3 What Are the impacts of Computer Design Software on Students' Learning of Graphic Design?

This sections also examine the effects of computer design software on students' learning of graphic design. The results are presented in table 6 below:

Table 7: Effects of Computer Design Software on Students' Learning of Graphic Design

Students' Responses

Statements	SA (5)	A (4)	N (3)	D (2)	SD (1)
I am able to develop new ideas on my own when computer design software are used to teach me	89 (31.2)	111 (38.9)	2 (0.70)	67 (23.5)	16 (5.6)
I enjoy graphic design lessons when my teacher use computers to teach	83 (29.1)	115 (40.4)	23 (8.1)	31 (10.9)	33 (11.6)
I find it difficult to concentrate on the main lesson, when my teach use computers to teach	35 (12.3)	38 (13.3)	67 (23.5)	72 (25.3)	48 (16.8)
I participate in graphic design lessons when computers are used in lesson delivery	88 (30.9)	64 (22.5)	32 (11.2)	42 (17.7)	59 (20.7)
I am motivated to learn more when computers are used in graphic design class	77 (27.0)	117 (41.1)	41 (14.4)	39 (13.7)	11 (3.9)

Source: Field Data (2023)

Percentages are in parenthesis

Scale: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)

Table 7 above shows results of students' responses on the effects of computer design software on students' learning of graphic design in Swedru SHS and Nsaba Prebyterian SHS in the Agona East District. The results indicated that out of the 285 students who responded to the questionnaires, 200(70.2%) of them agree or strongly agree that, they are able to develop new ideas on their own when computer design software are used to teach them. However, few of them 83(29.1%) disagree or strongly disagree to the statement. The results therefore mean that, teaching with computer design software enable students to be creative and also develop their own ideas. Secondly, majority of the students 198(69.5%) agree or strongly agree that, they enjoy graphic design lessons when their teachers use computers to teach whereas few of them 64(22.5%) disagree or strongly disagree. This means graphic design software used in teaching makes lessons interesting and enjoyable. Again, few of the students 73(25.6%) agree or strongly agree that they find it difficult to concentrate on the main lesson, when their teachers teach using computers design software whereas majority of them 120(42.1%) disagree or strongly disagree. This implies that, using computer design software in teaching does not make it difficult for students to concentrate in graphic design lessons. In addition, majority of the students 152(53.3%) agree or strongly agree that the use of graphic design software in instructional delivery encourages students to participate in graphic design lessons. Finally, majority of the students 194(68.1%) agree or strongly agree that, they are motivated to learn more when computers are used in graphic design class whereas few of them 50(17.5%) disagree or strongly disagree. This means graphic design software used in instructional delivery increases students' motivations to learn visual arts in the senior high schools.

To conclude, the results have indicated that graphic design software used in instructional delivery have a significant effect on students' motivation to learn graphic design. Specifically, it helps students to develop new ideas on their own, it makes them enjoy graphic design lessons, it encourages them to participate in graphic design and also increase their motivation to learn graphic design. The findings of this study supports the study by Toffah, Appiah and Boamah (2021) which sought to analyse the use of ICT in idea development in the design process with respect to graphic design education in the second cycle institution in Kumasi, and found out that, ICT helped in students' idea development even though per the pedagogy, teachers do not teach the students. The study findings again affirm the study by Yeoh (2002), which investigated the impact of computer technology on die design process of ideation in undergraduate graphic design students and found out that students made unintentional discoveries when using the computer, which in turn evoked new responses and stimulated new thinking. It was more than a tool because it helped to make the respondents' minds work and it enhanced their creativity. The phenomenon which emerged from the study alluded to the fact that computer technology inspired and developed new applications in its users. It was concluded in the study that the computer, as an "actual intelligence," was the means for augmenting human problem-solving. The secret to deriving solutions which assisted human in problem-solving was to provide the right toolkit—the computer, which was designed to complement human infallibilities. Again, the findings from the present study augment the findings of Adiji and Ibiwoye (2017), which revealed that computer graphics had influence on the practice of embroidery. Finally, the study finding is in line with Sebbeth (2017) study which analysed the Significance of introducing computer graphics into the Senior High School Visual Arts Programme in Ghana, and finally concluded that the

rate at which students could adapt to new learning techniques of using the computer in designing during the short period of training, attest to the fact that when computer graphics is given ample time on the time table, students will produce marvelous graphic design works.

4.3 Summary of Results and Discussion

From the analysis of data and results, it has been revealed that the graphic design software that are commonly used in Swedru SHS and Nsaba Presbyterian SHS are CorelDRAW and Adobe Photoshop. Also, it was shown that time constraint, lack of basic training for teachers and inadequate computers for both teachers and students are the main barriers to the use of graphic design software in instructional delivery in the senior high schools at Agona East District. And finally, it was found that graphic design software used in instructional delivery have a significant effect on students' motivation to learn graphic design. Specifically, it helps students to develop new ideas on their own, it makes them enjoy graphic design lessons, it encourages them to participate in graphic design class and also increase their motivation to learn graphic design.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter deals with summary of the findings, conclusions, recommendations and suggestions for further research based on collected and analyzed information in previous chapters.

5.1 Summary of Main Findings

1. The study findings showed that, CorelDRAW and Adobe Photoshop are the commonly used graphic design software in instructional delivery at Swedru SHS and Nsaba Presbyterian SHS.
2. The findings again showed that, the major barriers to graphic design software used in instructional delivery at Swedru SHS and Nsaba Presbyterian SHS are time constraint, lack of basic training for teachers and inadequate computers for both teachers and students.
3. Additionally, the study found out that graphic design software in instructional delivery have a significant effect on students' motivation to learn graphic design. Specifically, it helps visual arts students to develop new ideas on their own, it makes them enjoy graphic design lessons, it encourages them to participate in graphic design and also increase their motivation to learn graphic design.

5.2 Implication to Stakeholders

1. The study will aid visual arts departments in identifying the key areas of instruction that need improvement for graphic design software.

2. The suggestions given in the study can be used by the teachers who teach graphic design to give the students the necessary training, allowing them to perform at the highest level possible when it comes to computer graphics.
3. In order to provide further ideas in the same area of study, other researchers will base their suggestions for discoveries from this study.
4. Finally, the study findings will serve as reference point for future researchers who wish to carry out similar researches in other study areas.

5.3 Conclusions

The study sought to explore the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District. Descriptive survey design was the research design employed in the study. Frequencies and percentages were used to examine and interpret the data collected. In conclusion;

1. Research question one sought to identify some common graphic design software used in teaching graphic design in selected senior high schools at Agona East District. The study findings revealed that, CorelDRAW and Adobe Photoshop were the commonly used graphic design software at Swedru SHS and Nsaba Presbyterian SHS. In the researcher's opinion, teachers could diversify the graphic design software they use, and try other software such as Adobe Illustrator, Pagemaker, Adobe Flash, Mega Creator, etc. in teaching graphic design. However, the fact that they mostly use only CorelDraw and Adobe Photoshop may be due to their low level of knowledge in using instructional diverse software in teaching. Hence, the researcher recommends appropriate measures to deal with this problem.
2. Research question two also sought to investigate barriers to the use of graphic design software in instructional delivery in selected senior high schools at

Agona East District. The study revealed that, the major barriers to graphic design software used in instructional delivery at Swedru SHS and Nsaba Presbyterian SHS were time constraint, lack of basic training for teachers and inadequate computers for both teachers and students. Many schools still have strong attachment to the traditional mode of instructional delivery, that is, blackboard or whiteboard teaching. Therefore, they have indifferent attitude towards ICT in education in general. This has made it very difficult for schools, teachers and students to assimilate ICT (technology) into teaching and learning. The researcher is of the opinion that, the necessary recommendation given in the present study will help change this trend.

3. Research question three sought to examine the effects of computer design software on students' learning of graphic design. The study findings indicated that, graphic design software in instructional delivery have a significant effect on students' motivation to learn graphic design. Specifically, it helps visual arts students to develop new ideas on their own, it makes them enjoy graphic design lessons, it encourages them to participate in graphic design and also increase their motivation to learn graphic design. From these findings, the researcher has no doubt that using design software has tremendous impact on students' motivation, and perception and attitude about graphic design. In view of this, the government, management of schools, teachers, students, parents and all stakeholders in education must ensure that each stakeholders carries out its responsibilities in ensuring that graphic design and visual arts subject look attractive and interesting in schools.

5.4 Recommendation

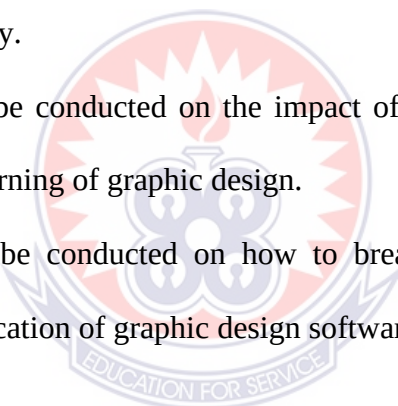
Based on the findings of the study, the following recommendations were made:

1. The government should invest more in ICT education, and provide schools with computers to enable teachers and students use more graphic design software in instruction in addition to the CorelDraw and Adobe Photoshop.
2. There is the need for management of schools to change their mentality about the old ways of doing things and embrace a more modern approach to instructional delivery. In doing so, they must ensure that ICT training programmes are organized for both teachers and students to be able to teach and learn with ICT tools effectively. Also, ample time should be allocated for the teaching and learning of graphic design so that teachers can incorporate ICT in graphic design instruction. These will help deal with the barriers teachers and students face when using graphic design software in instructional delivery.
3. Visual Arts teachers and students should be conscientized on the importance of ICT skills in today's technological era. They should be made aware that incorporating ICT in teaching and learning a subject like graphic design is a step towards achieving these ICT skills. This will encourage teachers to much importance to the teaching of the subject. It will also motivate students learn graphic design and give it the necessary attention it deserves.

5.5 Suggestions for Further Studies

The following suggestions were made for further studies:

1. In order to have a broader view of the use of Graphic Design Software in instructional delivery, the investigator recommends that further study should be conducted using other Senior High Schools in other districts or regions in Ghana.
2. Studies should be conducted on the effectiveness of graphic design software in teaching graphic design.
3. Studies should be conducted on the attitude of students towards Visual Arts as a subject of study.
4. Studies should be conducted on the impact of teachers' attitude towards the teaching and learning of graphic design.
5. Studies should be conducted on how to break the barriers hampering the successful application of graphic design software in instructional delivery.



APPENDIX 1

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APPENDIX 2
UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF EDUCATIONAL FOUNDATIONS
QUESTIONNAIRE FOR TEACHERS

The main purpose of this questionnaire is to explore the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District. The study is purely for academic purposes; hence, any information you give will be treated as confidential as possible.

SECTION A: Background Information of Participants

Please tick [✓] appropriately

1. Gender: Male [] Female []
2. Educational Qualification: Diploma [] Undergraduate Degree [] Masters Degree []
3. Years of Teaching Experience: Less than 5 years [] Between 5 and 10 years [] Between 10 and 15 years []

SECTION B: Some Graphic Design Software Used in Teaching Graphic Design in The Senior High Schools.

Please tick [✓] where applicable

1=Never 2=Sometimes 3= Often 4= Very Often

Statements	VO (5)	O (4)	S (3)	N (2)
I use CorelDRAW graphics to draw vector graph images during graphic design instruction				
I use Adobe Photoshop to guide students to design logos				

during graphic design instruction				
I use Adobe Flash software to support audio, animation, etc. when teaching graphic design				
I use Adobe Illustrator to teach students during graphic design period				
I use Mega Creator to build catchy graphics to teach students				

SECTION C: Barriers to The Use of Graphic Design Software in Instructional

Delivery in Senior High Schools

Please tick [✓] where applicable

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5= Strongly Agree

Statements	SA (5)	A (4)	N (3)	D (2)	SD (1)
Time does not permit the use of computers and computer software in graphic design instruction					
Teachers lack basic training in the use of computers and computer software					
Inadequate computers in the school hamper the use of graphic design software in teaching					
Large class size affects the use of					

graphic design software in instructional delivery					
Students do not show interest in lesson when computers are used in teaching them.					



APPENDIX 3
UNIVERSITY OF EDUCATION, WINNEBA
DEPARTMENT OF EDUCATIONAL FOUNDATIONS
QUESTIONNAIRE FOR STUDENTS

The main purpose of this questionnaire is to explore the use of Graphic Design Softwares in instructional delivery in selected senior high schools in the Agona East District. The study is purely for academic purposes; hence, any information you give will be treated as confidential as possible.

SECTION A: Background Information of Participants

Please tick [✓] appropriately

1. Gender: Male [] Female []
2. Age: 12-14 years [] 15-17 years [] 18 years and above []
3. Class/Form: Form 1 [] Form 2 [] Form 3 []
4. School: Swedru SHS [] Nsaba Presbyterian SHS []

SECTION D: Effects of Computer Design Software on Students' Learning of Graphic Design

Please tick [✓] where applicable

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5= Strongly Agree

Statements	SA (5)	A (4)	N (3)	D (2)	SD (1)
I am able to develop new ideas on my own when computer design software are used to teach me					
I enjoy graphic design lessons when my teacher use computers to teach					
I find it difficult to concentrate on the main lesson, when my teach use					

computers to teach					
I participate in graphic design lessons when computers are used in lesson delivery					
I am motivated to learn more when computers are used in graphic design class					



