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Challenges to Sustainability in the Graphic Design Practices of a Developing Nation

Ginn Assibey Bonsu, Alettia V. Chisin and Johannes Cronjé

Ginn Assibey Bonsu is a Ph.D. student at the Cape Peninsula University of Technology and his current thesis centers on interventions in design for sustainability in graphic design practices. His research interests include challenges to sustainable design, systems design for sustainability, and emerging advertising strategies. He works mostly in two research paradigms – interpretivism and pragmatism – which are driven by learning through participation.
ginnbonsu@gmail.com

ABSTRACT In this paper, we examine graphic design practices to highlight challenges to sustainability, how they manifest, and their associated outcomes in Ghana. It was discovered that the key challenges to sustainable practices were a lack of sustainability education, sustainability practice guidelines, and the improper disposal of waste chemicals. Other significant problems were air pollution, a lack of eco-papers and inks, poor gate-keeping of design content, and weak collaboration among designers. In addition, poor printing and weak design caused economic deficits, while some products designed for use were harmful to society. To minimize these challenges, we propose sustainability education for graphic designers, their production team, and clients. We further recommend that graphic designers should

Alettia V. Chisin is a senior lecturer at the Cape Peninsula University of Technology in the Design department and is currently active in post-graduate supervision in that department. Her research interests include practice-led explorations based on printmaking techniques and creative writing to inform design research. She has supervised many Masters students and is currently engaged in doctoral supervision. Her research areas include design for sustainability, socially conscious design, and design-led approaches to environmental issues relating to climate change.
ChisinA@cput.ac.za

Johannes Cronjé is a professor of computers in education and the Dean of Informatics and Design at the Cape Peninsula University of Technology. He has supervised or co-supervised more than seventy-two masters and fifty-five doctoral students and published more than forty-two research papers. His current research focus includes e-learning, instructional design and computers, and education, and he was also named the Top ICT Educator in Africa in 2008.
CronjeJ@cput.ac.za



observe professional ethics in their graphic design practices to promote sustainability.

KEYWORDS: graphic design, sustainability, challenges, eco-papers, gatekeeping

Introduction

This study responds to the academic research by Ceschin and Gaziulusoy (2016, 144), which is centered on an evolutionary account of design for sustainability. In their study, Ceschin and Gaziulusoy propose a framework of solutions based on the evolution of design for sustainability. In the last paragraph of their concluding remarks, they posit that their framework could aid design practitioners in identifying the appropriate approaches to use to minimize sustainability challenges (Ceschin and Gaziulusoy 2016, 149). However, looking critically at the complex nature of their design for the sustainability evolutionary framework, it might be difficult for some design practitioners – especially those in less privileged, developing countries – to adopt it as suggested. Many designers from developing nations might not be aware of their roles in the sustainable development agenda, the challenges their practices pose to sustainability, or even how to practice the suggested sustainability solutions. It is against this backdrop that we posit that, in practice, Ceschin and Gaziulusoy's (2016, 144) framework will be difficult to adopt because it does not map to solving any specific practical challenge. A lack of specific mapping is probably why there are so many "solutions" which are not applied. There is, therefore, a need to conduct research that aims to highlight the practical challenges to sustainability that designers encounter. This would help them to align these challenges with appropriate solutions, in order to spearhead the practice of sustainability, especially in a developing nations' context.

To help bridge the gap in Ceschin and Gaziulusoy's (2016, 149) recommendations, this study advances in the path of Dritz's (2014, 45) research, which focused on sustainable graphic design challenges but did not delve deeper into the challenges and how they manifest. Although Dritz's (2014, 45) research was done in a developed nation, our choice of a developing nation stems from the fact that every nation is supposed to contribute its quota to achieve the 2030 Sustainable Development Goals (United Nations 2015, 28). In this study, we argue that understanding the dynamics of the challenges and the resultant outcomes are prerequisites for proposing not only sustainable globalized solutions in graphic design practices but also for localized solutions.

The research, therefore, does not seek to predict why graphic designers do not practice sustainability and it does not make presumptions about graphic designers' awareness about sustainability. Rather, it focuses on the unsustainable practices graphic designers

and the assisting teams engage in, and how they manifest. Thus, in this research, we present the findings on challenges to sustainability in a local graphic design community in the Kumasi Metropolis in Ghana by asking the following questions.

1. What are the challenges to sustainability (economic, social, and environmental) in the graphic design practices of a developing nation?
2. How do these challenges manifest and what are the outcomes?

The research method chosen for this study was qualitative and the data gathering was done through participant observation and unstructured interviews. The research site was Asafo, a suburb of Kumasi in Ghana. Forty participants were interviewed while six graphic design firms were observed. It was discovered that the core challenges to sustainability were: lack of education on sustainability, sustainability practice guidelines, and lack of professional ethics. These led to a number of challenges, discussed in the findings. Graphic designers and their associated teams can minimize these challenges to sustainability when they are educated in these two key areas.

The Journey of Sustainability and Graphic Design

About five decades ago, Meadows, et al. (1972, 23) predicted that if the growth trend in the world population, industrialization, pollution, food production, and resource depletion continued unchanged, the limit of the planet (may) be reached within one hundred years. Thirty-five years later, Manzini (2007, 5) raised similar concerns about the limits of our planet, which needed urgent attention through *decoupling* to slow the growth to the limit. Dougherty (2008, 24) also reiterates similar sentiments and argues that there is an overconsumption of the planet's resources annually, which incapacitates its productive systems. Sustainability was therefore introduced along with "The Limit of Growth" in 1972 by Meadows et al. (1972, 23) and properly defined in 1987 at Oslo in the "Our Common Futures" report to incite and facilitate a mass movement participation to ensure wellbeing for all humans and for the natural world (United Nations 1987, iii). Reed (2006, 3), however, through a literature survey, noticed that the reactions to this challenge had been slow, fragmented, and insufficient. This was the basis for the initiation of Sustainable Development Goals by the United Nations for 2030, but much has not been realized in terms of achievement (United Nations 2018, 3). The United Nations' Secretary-General, António Guterres', report on the progress of Sustainable Development Goals for 2018 gives a current account of the state of sustainability. A section of the report relevant to this study reads:

More than 100 countries have sustainable consumption and production policies and initiatives. However, the report also shows



Figure 1

Graphical presentation of Sustainable Development Goals for 2030 (UNDP 2015, 1).

that, in some areas, progress is insufficient to meet the Agenda’s goals and targets by 2030. This is especially true for the most disadvantaged and marginalized groups. Youth are three times more likely to be unemployed than adults [...] Close to 1 billion mostly rural people still lack electricity. Nine out of 10 people living in cities breathe polluted air [...] Conflict, climate change, and growing inequalities add additional challenges. After a prolonged decline, the number of undernourished people rose from 777 million in 2015 to 815 million in 2016, mainly due to conflicts and drought and disasters linked to climate change. In 2017, the North Atlantic hurricane season was the most costly ever and the past five-year average global temperature is the highest on record [...] Without evidence of where we stand now, we cannot confidently chart our path forward in realizing the Sustainable Development Goals. (United Nations 2018, 3)

This report by António Guterres makes it clear that “Our Common Future” goals are farfetched, and therefore the world will need urgent and collaborative strategies to achieve the Sustainable Development Goals (United Nations 2018, 3). Graphic design must be among the professions to propagate and practice the agenda because it has been criticized for promoting rampant consumerism, misconceptions, and excesses in our contemporary society (Chmela-Jones 2014, 65). Among the critics of the graphic design industry is Garland, who asserted in his “First Things First Manifesto” that graphic design practitioners produce materials that cause environmental degradation which affects our society (Leblanc 2010, iv; Sargent 2013, 78). Graphic design, however, has also contributed immensely to social and economic development by creating materials for social work, mainstream education, and promotions for businesses through advertising, packaging, and other forms of communication design (Reese 2014, 4).

Now the question is: how does graphic design resonate with the Sustainable Development Goals? Figure 1 provides the Sustainable Development Goals linked to graphic design. These are Goals 8, 12,

13, 15, and 17. The various interconnected activities graphic designers engage in – from the conception of ideas to delivery of the end product and the disposal of the product’s container after usage (the product life cycle) – resonate with the six Sustainable Development Goals mentioned above. For instance, byproducts of graphic design production (such as waste chemicals from printing, image-setters, burning of spoiled papers, plastic bag disposal, and so forth) have repercussions for our planet. The graphic design profession must awaken to its role in advancing sustainable practices.

Most researchers have outlined different ways that graphic designers can practice sustainability, but few graphic design firms are embracing these principles, including in Africa, with its associated problems (Mitchell 2012). Benson (2007, 2) for instance, has proposed guidelines for practicing sustainability through his *Re-nourish* website, but little is being done to put theory into practice. The situation is incomprehensible: either graphic designers do not know that sustainability is an issue or they think that their responsibility stops at recycled paper and soy inks (Mitchell 2012).

Moreover, proposals towards sustainability integration in graphic design are geared towards environmental sustainability, labeled “green” graphic design (Dougherty 2008, 1). Green graphic design is also advanced by Sargent (2013, 79), and many graphic designers have zealously adopted sustainability principles in their production methods and use materials such as recycled paper stocks and less harmful inks and glues, with the consent of their clients. These serve as a telling example of the bias towards environmental sustainability because the concept of sustainability envelops economic and social domains as well (Sherin 2008, 12). The green approach to sustainable graphic design and research conducted by Dritz (2014, 45) vividly shows that the practice of sustainable graphic design is still in its infant stage (as shown in Figure 2). This highlights the sustainability gap in graphic designers’ practice, because Dritz’s (2014, 45) findings are more scientific and evidence-based. It is, therefore, a matter of concern that graphic designers have been slow in embracing sustainability and this necessitates the urgency of investigating the challenges hindering graphic designers from engaging in sustainable practices in order to help propose solutions to minimize them. The next sub-topic explores the causes in literature.

Graphic Design is Still at the Foot of the Sustainability Ladder: What Went Wrong?

Before exploring the literature for the challenges that prevent graphic design in climbing the sustainability ladder, we will first explain sustainable graphic design to create the context for the discussion. Sustainable design is the application of sustainability principles to graphic design practice that considers the full life cycle of products and services and a commitment to strategies, processes, and materials that value environmental, cultural, social, and economic

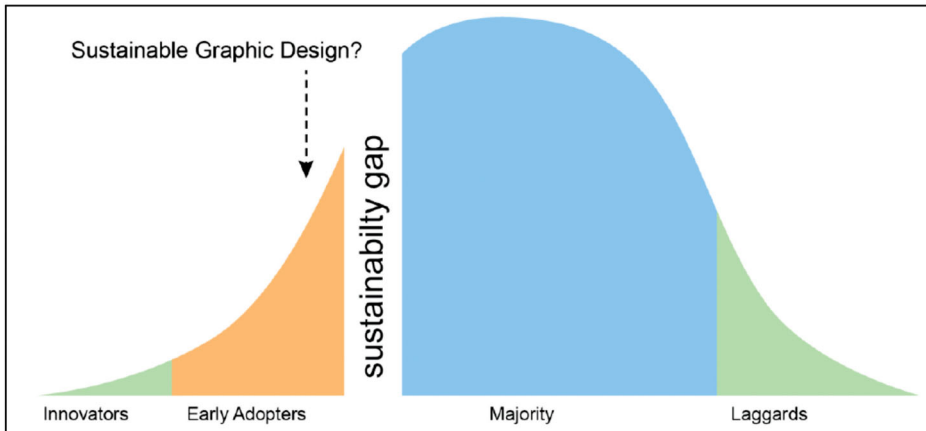


Figure 2

Sustainability adoption curve (adapted from Dritz 2014, 45).

responsibility (Society of Graphic Designers of Canada 2018). This definition broadens the scope of traditional graphic design that uses text and images to communicate strategically. Thus, from a sustainability perspective, graphic designers need to operate in both upstream (promoting products and services through concepts to meet marketing plans) and downstream (considering materials, manufacturing, distribution of products) activities through the lens of sustainability (Dougherty 2008, 46). To move from text and image manipulation to a whole life cycle of a product requires a radical mental shift. There is no doubt that graphic designers are struggling with the shift; however, the shift is prolonged, calling for investigation into the causes. Among the forerunners in this regard is Dritz (2014, 45), who conducted research focusing on the practice of sustainability in graphic design and discovered that the majority of graphic designers were still not engaged in this practice (as shown in Figure 2).

Dritz (2014, 35) identified the key setbacks to practicing sustainability in graphic design.

1. Clients found it difficult to understand the concept of sustainability, and thus graphic designers had to explain over and over again the practical implications and associated deliverables. Yet most clients could not identify with the concept, which derailed their interest. Some graphic designers interviewed did not see the economic value in sustainability and were not sure whether the outcomes of sustainable practices could meet all the criteria of conventional graphic design.
2. The second challenge (Dritz 2014) identified was lack of adequate information and support structures for sustainable graphic design practices. Some graphic designers found the definition of sustainable graphic design to be vague and that it needed to be reframed for easy understanding and application.

The two major challenges that emerged in the literature pointed to the fact that there is a lack of education concerning sustainability integration into graphic design, both at the institutional (educational) and industrial levels. Researchers have offered many solutions, but they tend to employ inflexible approaches with which graphic designers in different parts of the world have difficulty identifying. Other related literature has been categorized into the three domains of sustainability (environment, society, and economy), which are discussed in the next sections.

Challenges to Environmental, Economic, and Social Sustainability in Graphic Design Practices

In the context of challenges in graphic design practices to environmental sustainability, the review covered practices that pollute the air, water bodies, unnecessary over-consumption of input materials like paper, plastic/rubber, as well as the disposal of waste substances (Society of Graphic Designers of Canada 2018; Dougherty 2008, 46). The literature on environmental sustainability regarding graphic design practices mostly captures post-disposal environmental threats from packages. Packaging waste generated, especially in the Western world, constitutes one-third of the non-industrial solid waste. As other countries strive to improve their economies, even more packaging will be produced and more waste will be generated (Jindal 2010, 108). Only fourteen percent of plastic package waste is recycled, with some of the remainder finding its way into the ocean, threatening the marine ecosystem and poisoning the water (The Guardian 2017). At least 8 million tons of plastics leak into the oceans every year and packages are among these plastics (Jambeck, et al. 2015).

On social and economic levels, graphic design is described by Leblanc (2010, vi) as a discipline manipulated by companies for economic gain, irrespective of the negative effects of their actions. Cormie et al. (2009, 4) argue that consumption of “undesirable” goods or products (dog biscuits, cigarettes, and others) cannot be reduced by simply limiting or banning advertisements. There are certain illegal products that still sell and are over-consumed without being advertised. Glaser (2010) adds that designers are always in a weak position, as they act as mediators between their clients and the clients’ customers. Thus, they are not responsible for the marketing objectives, the selection of what products are to be sold, or for determining what information to include or reject (Glaser 2010). However, Chandon and Wansink (2007) also discovered that packaging is one of the enablers of food consumption. All the discussions on the challenges to sustainability show that some graphic designers are able to meet the economic standards of sustainability but fail in the interlinked social and environmental dimensions. The failure is a result of some graphic designers’ inability to consider the effect of their work’s waste on the environment and on societal health. Designers should, therefore, position themselves as

Table 1
Dimensions and themes of the Sustainability Development Analytical Grid (adopted from Villeneuve et al. 2017, 5).

Environment	Social	Economic
Renewable Resources	<u>Health Safety/Security</u>	Ownership/Goods/
Non-renewable Resources	<u>Education Individual</u>	Capital <u>Quality</u>
Resources Energy	<u>Integration</u>	<u>Goods/ Services</u>
<u>The output from Human Activities</u>	<u>Freedom/</u>	<u>Responsible</u>
<u>Biodiversity Land use</u>	Responsibility	<u>Consumption &</u>
<u>Pollutants</u>	Recognition	<u>Production Financial</u>
	Culture	<u>Viability</u>
		Wealth Creation
		Wealth Sharing
		Work Conditions

mediators for end-users and the environment in order to create “good designs that do good” in their practices (Berman 2008, 2).

Theoretical Framework

This paper used two theoretical frameworks. The first theoretical framework is the Sustainability Development Analytical Grid, which was used as the lens for assessing graphic design practices to sift out the unsustainable practices. The second was Activity Theory. Activity Theory was used in analyzing and discussing the challenges to sustainability.

Sustainability Theory

The Sustainable Development Analytical Grid was used as the theory for the assessment of graphic design practices in this paper because it was more established and tested by researchers (Villeneuve, et al. 2017, 5). However, the Sustainable Development Analytical Grid consisted of five domains (ethical, social, ecological, economic, and governance) instead of the three known sustainability domains. Therefore, only the three domains (economic, environmental, and social) which were in-line with the established triple bottom line in sustainability were selected (Villeneuve et al. 2017, 5). Table 1 shows the three selected dimensions and selected themes, which have been underlined. Table 2 also shows the relevance of selected domains and themes as sustainable assessment tools for graphic design practices.

The Sustainability Development Analytical Grid was derived from “sustainability”. Sustainability was introduced to counter the consequences of industrialization, such as the rapid destruction of resources from planned gross consumption (Dragustinovic, 2011). Sustainability is, therefore, a “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). This definition throws light on fairness in the distribution of resources between current and

Table 2
Justifications for selected themes of indicators.

Indicator	Theme	Justification
Environment	Renewable Resources	Materials: paper, plastics, cloths, inks and other substances for printing
	The output from Human Activities	The output from the graphic design production
Social	Pollutants	Waste disposal
	Safety/Security	Safety of graphic designers and printers
	Education	Upgrade courses for designers and printers
Economic	Individual Integration	Collaborations among the graphic designers
	Quality Goods/Services	Quality of printed work
	Responsible Consumption & Production	Usage of materials and production strategies
	Financial Viability	Profit and loss

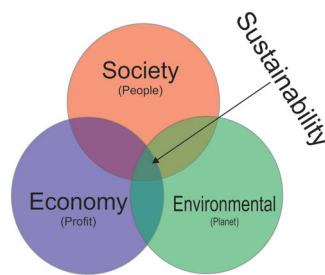


Figure 3

Interlocking circles model of sustainability (source: Lee 2014, 160).

future generations through management, maintenance, and improvement (Jabareen 2008, 184). Figure 3 is a sustainability model that suggests that, for sustainability to be achieved, there should be a balance in society, the economy, and the environment (Lee 2014, 160; Bossel 1999, 2; Gomis et al. 2010, 16).

Activity Theory

Activity Theory is a framework for analyzing activities in which people engage (Jonassen & Rohrer-Murphy 1999, 62). Activity Theory also helps in understanding actors and their culture based on the artifacts they create (Engeström 2001, 134). Activity Theory is, therefore, how rules, tools, and communities interrelate to produce an outcome (Stetsenko & Arievidtch 2004, 486). Currently, there are three types of activity systems, labeled as the first, second, and third generation. Each generational type has a focus based on the unit of analysis. This paper used the third generation Activity Theory shown in

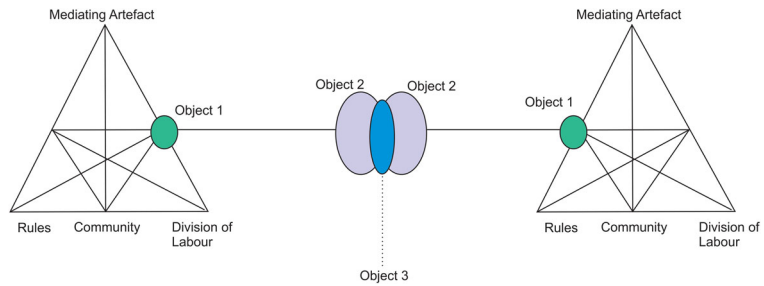


Figure 4
Third-generation Activity Theory model (adopted from Engeström 1999, 2).

Figure 4 because graphic design practices consist of various activities coming together to form a single outcome.

The graphic design practices observed in this study consisted of six different activities, which were all placed into three categories: namely, pre-press, press, and post-press. Activity Theory was used to discuss the interactions among the units in graphic design practices.

Materials and Methods

The research method chosen was qualitative because the study aimed to explore graphic design practices through an ethnographic approach to discover the challenges to sustainability in graphic design practices. The data were collected through participant observation and unstructured interviews for in-depth information (Williams 2011, 67) on graphic design practices. The areas researched were how graphic designs were created and how graphic design production was done. The intention of researching those areas was to explore the underlining social and economic issues in creating graphic design products, as well as the environmental threats inherent in the production methods used.

The site for this research was Asafo, a suburb of Kumasi in Ghana; a developing nation in Africa that shares common characteristics with the other fifty developing nations in Africa (Africanvult, 2018). This selected suburb is a center for graphic design and printing firms sharing common characteristics with other towns in the other ten regions in Ghana. It has over fifty graphic design and printing firms. The research samples were purposefully selected based on the three phases of graphic design practices (pre-press, press, and post-press) and the available participants, as shown in Table 3. Six graphic design firms were studied through participant observation, while forty participants were interviewed in all. Table 3 shows the three phases of graphic design processes for participant observation and the samples selected from each for the unstructured interview. The findings were categorized into themes and assessed through the lens of the Sustainability Development Analytical Grid.

Table 3

Graphic design practice phases in the context of sustainability and the associated data-gathering tools.

Phase	Activity	Participants	No. of Participants	Data Gathering Tool
Pre-press	Ideation and designing of graphic materials	Graphic designers, art-directors and clients	14	Participant observation
	Separation using image-setter to convert design into images on films	Graphic designer/ Art-director		Interview guide
	Images on films were transferred unto a planographic plate	Plate burner operator	6	Interview guide
Press	Printing of the design work using the planography plate	Printing machine operators	14	Participant observation Interview guide
Post-Press	Collating, binding, trimming, and delivery of finished graphic design product	Art-director or a dispatch rider	6	Participant observation Interview guide

Results

The study aimed to explore the various challenges to sustainability in graphic design practices, how they manifest, and the associated results. The research findings are categorized into the three domains of sustainability (economic, social, and environmental), and are predominantly participant-observation data.

Challenges to Environmental Sustainability and How They Manifest in the Practice of Graphic Design

The study revealed that most of the challenges with environmental sustainability were associated with the production process after the designs had been made. After production, the designs were transferred onto films using a machine called an image-setter before they were transferred onto a planographic “plate” for printing. The image-setter used chemicals, such as developers and fixers, for making the films and plates for printing. These chemicals have caution labels on the containers but, due to a lack of understanding and negligence of the safety symbols, the waste chemicals were disposed into gutters. These gutters flowed into streams and rivers, threatening the organisms in these habitats. Upon further inquiry into why the chemicals were disposed into gutters, the majority revealed that such disposal was the only option they had. They were unaware of the harmful effects of the chemicals if leaked into streams or rivers (Figures 5 and 6).

The second finding was on the printing inks used containing acid and lead, which are detrimental to environmental health and also



Figure 5
A designer removing the weak developer from an image-setter for disposal (authors' photograph, 2018).



Figure 6
The first tray is a developer and the second is a fixer; beside is the container in which weak chemicals are disposed and then, when full, disposed into a nearby gutter (authors' photograph, 2018).

gradually destroy parts of the printing machines. According to an art director and a dealer in inks, it was discovered that most of the inks contain acid and other harmful chemicals but were cheaper compared to the eco-inks, which were non-harmful. Most art directors and printing machine operators were not even aware of the availability of vegetable inks and the few who were said they were too expensive for clients to use. The chemicals used for washing the inks off after printings were also not environmentally friendly and harmful to breathe; most of the printing machine operators used petrol and kerosene to wash off the inks after printing, putting their health, as well as the environment, at risk.

Thirdly, it was discovered that the general paper waste challenges at Asafo were mostly a result of typographical errors and wrong colors used. In an interview with one designer, the graphic designer disclosed that a total of 20 thousand labels of A4 size were discarded because the Ghana Environmental Protection Agency number was



Figure 7

Used films to be disposed (authors' photograph, 2018).

(unknowingly) not captured on the label by the graphic designer. A similar case was recorded when another set of printed labels were rejected because of a grammatical error, which was identified at the point of delivery. Most labels were varnished or laminated, making them difficult to reuse when rejected. A large number of the papers used were not recycled papers. Clients believed that the quality of the graphic design product did not only depend on the design but also on the quality of the substrate material; they had difficulty accepting recycled papers, which were judged as inferior. For instance, a magazine printed using a low-grade paper for a group of medical professionals was near rejection because, they explained, the higher the grade of the magazine's paper, the more important it appeared to readers. These challenges are related to social status but lead to degradation of the environment, as such high-quality papers cannot be obtained from recycled paper sources.

It was also observed that the films used for transferring images onto the planographic "plates" for printing had no other economic value after their use and were mostly dumped into landfills. Because they are made from rubber or plastic, they take a long time to decompose. Figure 7 shows the used films with no economic value.

In the field of digital printing, challenges were present in both the oil and eco-inks. The oil-based colors are hazardous for people and the environment, but they last longer for billboards and all other forms of outdoor advertising. The oilinks for digital printing had a strong, pungent smell that was obviously noxious when inhaled. Figure 8 shows a designer at work with no safety breathing guard against the strong scent of the inks. The ink residue from digital printing machines was also disposed into gutters. Thus, the major sustainability challenges in the field of digital printing were health- and environment-related.

Challenges to Economic Sustainability and How They Manifest in the Practice of Graphic Design

The economic component of sustainability in relation to graphic design is less researched; however, the economic themes were used as the guidelines, as shown in Table 2 (Villeneuve *et al.* 2017).



Figure 8

A designer at work with no protection against the strong scent of the harmful inks (authors' photograph, 2018).

Related to this, it was observed that color profile settings and the output printing presented challenges for some of the designers. In some cases, the designs on the computer screen did not match the output copy printed because the designer used colors of light (RGB) instead of process colors (cyan, magenta, yellow, and black; CMYK), which led to clients rejecting the printed work. In the area of spot colors, they were manually mixed and that made it difficult to obtain the perfect color of a client's brand. The process colors (CYMK) were visually checked using the color calibration codes, which were also affected by the available light and did not guarantee the perfect outcome. Most of these challenges led to the rejection of printed works, causing economic deficits for most firms.

Another economic challenge was poor proofreading and grammatical errors, which cost most of the companies at Asafo in Kumasi. These grammatical challenges were, in part, the result of the poor education of some of the designers and poor English skills. These designers were trained in the use of the design applications, but not in copywriting or editing. In addition, the graphic design software used was frequently either out of date or pirated, and that affected the design work output. Also, a lack of appropriate finishing equipment delayed jobs and added to the cost. More hands were needed to finish some of the jobs and more hands meant increased labor expenses. The outcome was that companies lost financially, affecting the graphic design firms' economic sustainability.

In all the stages, from the graphic designer to the last worker involved, the majority of participants exhibited a lax attitude towards the work being done with no sense of professionalism, which affected the outcome of the printed work. As a result, most companies in Ghana take their graphic design jobs abroad for printing. In addition, many graphic designers resign from graphic design firms because these companies follow the "apprentice and master"

learning approach: when designers become skillful, they leave to start their own design firms or to become freelance designers. Most of these designers take their mother companies' clients and provide them with design services, reducing their mother companies' number of clients, and thus affecting the economic sustainability of the graphic design firms.

Challenges to Social Sustainability and How They Manifest in the Practice of Graphic Design

Social sustainability in the context of graphic design is a less researched area. The themes under the social dimension were used as a guide for exploring the social sustainability challenges in the sphere of graphic design. The findings centered on graphic designers serving as gatekeepers for social welfare, rendering corporate social responsibility services to the community, cohesion among graphic designers in their firms, and, lastly, the safety of graphic designers and the production team in rendering their tasks. Regarding gatekeeping for the welfare of society, it was discovered that the key mandate for most of the companies was to become financially strong, so they were ready to proceed with whatever it would take to achieve this, irrespective of the consequences to society. Some designed packages and labels were found on the market for products that did not meet the Food and Drugs Board Authority's requirements in Ghana because unscrupulous manufacturers managed to convince graphic designers with no ethical concerns to assist them in the marketing of these products (GHANA FDA 2018).

These findings are in line with Leblanc's (2010, vi) assertion that graphic designers are manipulated by companies for economic gains because the graphic designers lack ethics in pursuit of profit. Some of these products promoted by the graphic designers through their designs end up harming people or damaging their organs or deforming them; from bleaching pomades to oral medications. All these actions threaten social sustainability in the practice of graphic design without ethics. Below are responses from some of the graphic designers on ethical challenges.

Designer 2:

"I really care less about the society I provide service to through my clients; all I want is the benefit of the designing personally. Anything after that is not my concern; it should be the concern of the client and not me. What do you think?"

Designer 4:

"Though I am a graduate designer and aware of some of the effects of the chemicals on people, I cannot add that to my task because I am not paid to do that. I am paid to provide graphic



Figure 9

Printing machine operator with no ear protection (authors' photograph, 2018).

design services. People who design for cigarette companies know it kills and has even written on it that it kills, what are the large control agencies doing about that? If the control organizational bodies cannot stop those cigarette companies, I beg we also will not stop designing for them. If we stop designing for such companies who are our core clients how will we survive economically?

The responses show that graphic designers are weak in ethics and, therefore, there is a need for graphic designers to act professionally because they serve as the gatekeepers of society. In the area of cohesion among the graphic designers, there was no organized body that brought them together to deliberate on issues concerning themselves.

The last finding was on the safety of the workers. Most of the challenges were with the printing machines and the cutting machine operators. The printing machines produced loud noise, but the operators had no noise protection. According to one machine operator, it affects their hearing, as shown in [Figure 9](#). The cutting machines threaten the operators' fingers. One cutting machine operator had three of his fingers cut off due to a mechanical error and, unfortunately, he had no health insurance. [Table 4](#) gives a summary of the findings.

Discussion

[Figure 10](#) shows the challenges to sustainability in graphic design practices labeled as the tensions in the three phases of graphic design practices (pre-press, press, and post-press), captured using

Table 4

Summary of findings.

Sustainability Dimension	Challenges	Manifestation	Results
Environmental	Lack of understanding of instructions on chemical disposal and negligence	Chemicals were disposed into gutters leaking into streams and rivers	Life-threatening to fish in streams and rivers and humans who might drink from them
	Oil inks contained acid and harmful chemicals but the eco-inks were scarce and expensive	Destroys part of printing machines and ink waste was disposed of into gutters	Printing machines parts wear easily and are replaced often
	Ink washing chemicals were expensive	Kerosene and petrol were used for washing machines	Chemicals used for washing printing machines were also harmful to the machine operators and destroy part of machines
	Typographical and wrong color output	Errors were identified in the designs after printing	All printed material became waste because they were rejected by clients
	Lack of knowledge on waste separation	Plastic, paper, and cloth were put together and disposed of into landfills	Landfills increase in size and produce a bad odor that pollutes the air during burning
	Films had no economic value	Waste films were disposed of in landfills.	Landfills size increase and consumes useful lands
	Oil inks for digital printing last longer but were hazardous for the environment and humans when inhaled	People find it difficult to breathe when working with the oil ink but prefer that to eco-inks because the images last longer on banners and billboards	People who work with oil inks for digital printing suffered breathing complications and the disposed of chemicals also pollute streams and rivers
Economic	Lack of understanding of color profiles and colors were visually checked	Most of the young designers used colors that were different from the specimen from clients after printing	Works were rejected because colors differed from company branded colors
	Poor proof-reading, typographical, and grammatical challenges	Errors were identified in the designs	The finished works were rejected for costing the companies too much
	Mediocre attitudes	The designers, printers, and the cutting machine	Works were rejected and the company

(Continued)

Table 4*(Continued).*

Sustainability Dimension	Challenges	Manifestation	Results
	towards professionalism	operators recklessly accepted any outcome from their processes, which fell short of the acceptable standards	suffered financial implications
	Designers resign indiscriminately	Most of the design firms have amateur designers, especially if the CEO is not a designer himself or herself	Many works done by those graphic design firms with amateur designers hardly met professional standards
Social	Most of the firms felt they were too young to engage in social responsibility tasks	Few social responsibility works were done	The society did not benefit from the firms from a corporate social responsibility perspective
	Some designers, printers, and cutting machine operators failed to observe safety precautions	They failed to wear safety materials like earplugs, lack of observation of safety precautions when cutting papers	Have difficulty in hearing and had breathing challenges
	Most of the graphic designers and machine operators did not go for skills orientation or skills upgrade	Most of the designers and machine operators were not abreast of the current trend in designing and designing applications and machine operations	Works were taken to foreign countries to get done
	Lack of knowledge about social sustainability	Most of the graphic design firms want to become financially strong and were willing to produce anything as far as financial benefits were concerned	Some harmful products unapproved by FDA/EPA were sold to people, which harm them
	Most clients were unaware of sustainability	Some clients prefer to use a material that was not environmentally friendly, and non-economical, termed as "status-related materials"	The environments are littered, gutters become choked, packages find their way into streams and rivers and even into the sea

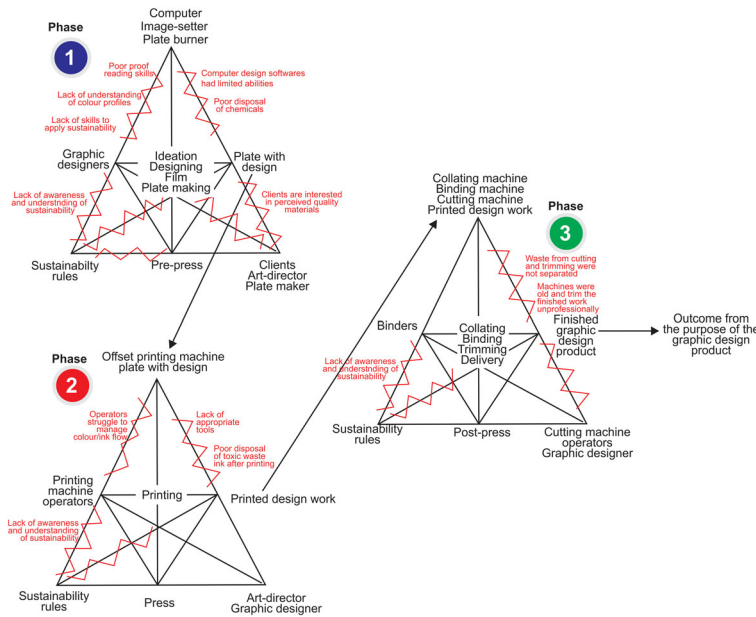


Figure 10

Tensions in the three phases of graphic design practices in the context of Activity Theory with sustainability in retrospect (authors’ construct, 2018).

Activity Theory and assessed through the Sustainability Development Analytical Grid. The underpinning of all the tensions/challenges were crystallized as a lack of sustainability education and awareness, a lack of designed guidelines to support the practice of sustainability in graphic design, and a lack of professionalism in graphic design ethics. The sub-sections discuss the tensions/challenges in detail.

Tensions in Phase One

In the first phase, activities (as captured in Figure 10) were: ideation, designing, and plate making. The subjects in all these activities were graphic designers. The analysis was done based on the interactions among the various units in the Activity Theory based on graphic design practices. The first tension was between the *rules* (sustainability) and the *subjects* (graphic designers). The graphic designers’ activities were devoid of the principles of sustainability, which affected the selection of *tools/materials* (computer software applications, image-setter, films, and plate burner) and how they were used. These tensions crop up in graphic designers’ use of the tools resulting from the lack of understanding of the color profiles, poor proofreading, and gatekeeping of design content. In the area of *the division of labor* (art directors, clients, and “plate” makers), the tensions emanated largely from the art directors and the clients. The clients had preconceived the quality of work they wanted, and some were not ready to take any advice from the designers due to their

lack of knowledge about the consequences of their choices on the environment and on society.

The art directors also compelled the graphic designers to work according to clients' preferences. The last tensions emanated from the tools and materials. The design applications (tools) had limited functionalities, which wasted designers' time in trying to solve technical challenges. Also, waste chemical disposal from plate making was inappropriate. All of these challenges occurred because the graphic designers, the supporting team, and the clients lack understanding of the repercussions of unsustainable practices. Though some were aware of eco-paper and inks, they did not know how their practices could connect to sustainability in their local context and the benefits it could bring. These key tensions are in line with Dritz's (2014, 35) findings, which point to a lack of understanding of the concept of sustainability and sustainability practice guidelines for designers. These challenges occur because education on sustainability in the context of graphic design practices has not been addressed in most design institutions and design associations in West African countries based on the interview responses. Low staff capacity, poor remuneration, and, to some extent, the unavailability of qualified experts also lead to excess waste.

Tensions in Phases Two and Three

In the second phase (as shown in Figure 10), the key tensions were among *the subjects* (printing machine operators), *rule* (sustainability), and the *division of labor* (art directors and graphic designers). Printing machine operators lacked awareness and education about sustainability, which was noticed in their inability to comply with the instructions given by the graphic designers and the art directors. In addition, some compliance issues were beyond them: for instance, a lack of tools (such as a color densitometer) for confirming that the right colors were obtained during the selection of printing and printing ink. Tensions generated by the machine operators were a lack of skills in ink control, the inappropriate disposal of toxic waste ink, and the burning of waste substances. Tensions identified in the third phase (as captured in Figure 8) were the lack of waste separation, unprofessional binding, and poor trimming. From an interview with the binders and cutting machine operators, it became apparent that these challenges were a result of their inability to attend workshops or educational courses.

It is clear that the lack of education in sustainability and the lack of sustainable practice guidelines for graphic designers were the core challenges to sustainability in graphic design practices. This paper reveals a lack of awareness and knowledge among all the subjects in all the three phases pertaining to sustainability, which gives birth to all the tensions discussed. From the quantified challenges (shown in Figure 9), it is clear that most challenges occur at the pre-press stage and are socially oriented, indicating that the graphic designers, clients, and art directors are the core actors in the challenges. These

social challenges are also design-related and thus any solution to these challenges should target the pre-press environment and its associated actors.

Conclusion and Recommendations

According to our findings, it is apparent that the bottom line of all the challenges to sustainability identified in graphic design practices can be categorized into two streams. The first is the lack of awareness and education about sustainability among graphic designers, the production teams, and their clients. The second is a lack of supporting structures to make the practice possible. We have shown how the challenges manifest and the resulting outcome in the graphic design practices of a developing nation. These outcomes have also revealed the state of the graphic design industry in a developing nation's practices from a sustainability perspective. While the practices are far from sustainable, they are not beyond correction. These challenges show what graphic designers lack and how sustainability in graphic design practices can be facilitated in a developing nation. On the other hand, these challenges are also related to professionalism and ethical dimensions. Thus, if graphic designers are educated in these two areas, their negative impact on sustainability will be lessened because they make most of the decisions in all the phases. The findings can also help policy makers, educators, and organizational bodies to become aware of the menaces of current graphic design practices and the need to act in diverse ways to counter them.

Policy Recommendations

The Government and The Municipal Assembly must initiate policies on the disposal of waste chemicals for graphic design production. Education on sustainability and the consequences should be accomplished by the Environmental Protection Agency and organized graphic design bodies using the policies initiated. Graphic designers and machine operators should also collaborate with the Environmental Protection Agency to become familiar with the appropriate means of disposing waste ink residue. The Government or the Mayor of Kumasi Municipal Assembly must ban the use of plastic and other unsustainable materials. The Government should also support graphic designers by subsidizing eco-inks and eco-materials. The duties for importing sustainable materials for printing firms should be lifted by the Government to facilitate graphic designers' practice of sustainability.

Practical Recommendations

Short lifespan design projects, such as funeral posters and wedding invitation cards, should be done in digital form and disseminated via social media platforms to reduce paper consumption. Graphic design

firms need to embrace new technologies that will minimize waste and maximize the efficiency of their output by collaborating to buy state-of-the-art, current equipment. In order to conserve drinking water, water for washing or used in processing should be non-potable. Graphic designers need to explore how to make the eco-inks stable or “fast”, or how to make the inks last longer, especially those used for printing billboards locally. Though graphic designers and firms have the goal to make their companies economically sound, they should not compromise the safety of society and the environment. Designers should, therefore, ensure that all products they design, labels, and packages are approved by the Food and Drugs Authority and Environmental Protection Agency.

Further Study Recommendations

Further studies should be conducted exploring how the tensions in the activities in [Figure 10](#) could be eased using design interventions. The educational interventions could be to introduce graphic designers to the three phases of the rules (or dimensions) of sustainability, which will guide the subjects in the usage of the tools and the selection of materials to create a sustainable object. Another future study could map existing solutions to the challenges highlighted in this paper to serve a guide for graphic design practitioners.

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