Zephaniah Lukamba is currently pursuing a Masters in Fine Art and Design, specializing in Painting, at Kenyatta University, Kenya. He is also a practicing artist who has ventured into using different tools during his painting processes, in an attempt to induce emotions in a viewer using tactile texture. His paintings take a critical view of nature and social issues. In the last five years, Lukamba has been privileged to exhibit at the National Museum of Kenya since 2016, Kenya art Fair (2017), McKinsey Mtaani exhibition (2017 & 2018), Manjano exhibition (2020), Sztuki Schowek gallery in Poland (2021), One-Off Gallery (2020-2022) among others.

Dr Kamau Wango has taught Fine Art for many years at Kenyatta University and holds an M.A and Ph.D. degrees in Fine Art from Kenyatta University. His areas of interest are drawing, painting and sculpture as well as history of Art. He is very passionate about the ability of students to develop an intellectual capacity and be able to study and understand society as a basis for the comprehension of issues that affect the society for which they endeavour to become

creative opinion leaders and also forms the basis for both 'expression' and 'self-expression'. He believes that students must be critical thinkers in the quest to be creative pace setters. He is also a firm believer in the need for new research and innovation. He is a former Chairman of the Department of Fine art and Design and is currently the Chairman of the Postgraduate Committee of the Department. He has published papers on various pertinent issues in Fine Art, particularly on student creativity and thought.

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EXPERIMENTATION WITH WASTE INK AS A PAINTING MEDIUM

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Abstract

The print, media and publishing industries produce, on an everyday basis, abundant waste ink that is mostly directly cast-off into the environment. This waste causes ecological degradation that ultimately leads to climate change. To reduce on the risk, researchers have found out that waste ink can be upcycled into a useful artistic medium that artists can use to create their works of art. There, however, is minimal research that has documented the experiments that have been undertaken with the waste inks by, for example, describing the colours that would be produced when the waste inks are applied to different surfaces using different tools and techniques and also what best preservation method there is for the medium. In light of this gap, this paper reports a study that sought to document the results of experiments done with upcycled waste ink in a bid to produce an effective painting medium. This study applied an exploratory research design study in examining the suitability of waste ink based on variables such as effect on conventional and non-conventional surfaces, reaction to colour inks, painting and drawing techniques and modes of preservation. The

results of the study were documented and used to inform the efficacy of upcycled waste ink in the painting genre.

Keywords: ***Upcycle, Painting medium, waste ink,***

Introduction

Throughout the history of art, artists have used a variety of painting media to express themselves. Kusmara (2013) affirms that the artists are generally not linear in the use of a specific material but they tend to be more "open" to the prospect of using a number of media. The sensuous features and expressive potential of a media, such as tempera, fresco, oil, acrylic, watercolour or other water-based paints, gouache, or ink, influence the decision of what material the artist should employ (Owen, 2021).

Davids (2010) argues that Ink is one of the media largely used in the delineation of objects by artists. There are many types and kinds of Ink. Jose-Yacaman *et al.,* (2006) writes about the three main variations of Black ink, that is: gallotannate ink (also known as iron-gall), Chinese ink, and printers' ink. Printers' ink is said to be equivalent to ballpoint pen ink and contains a variety of colours as well as desiccants (calcium and iron compounds), waxes, fats, rubber, and varnish. Chea (2009) writes about printing inks by stating that there has been an increase in printing technologies that employ printing inks and in so doing immensely increased the quantity of printing inks required in the printing industry. Ahmed (2007) confirms this view by stating that over 90 per cent of inks used in the printing industry are printing inks. As a result, a large amount of byproduct of printing inks, known as waste ink, is being produced by printing industries.

Appiah (2002) describes waste as matter that is lying unproductive, uninhabited, or abandoned and that most waste appears in three forms: solid waste, air emission, and wastewater (liquid waste). Waste ink produced from a printing press commonly falls under two classes: uncontaminated and contaminated. The ink that has not been used in a press fountain is referred to as uncontaminated ink, while contaminated ink is that that has been exposed to solvents, paper fibres, and other ink colours while being utilized in a press fountain (Ink Waste: It's Not Black and White, 2014).

Despite there being numerous recycling centres, landfills and incineration centres for waste ink, studies have shown that due to the rapid development of printing industries more and more off-load of waste ink has been made into the environment adversely polluting it and leading to Climate Change. There is therefore need for alternative uses of the waste ink. One alternative is for waste ink to be upcycled into useful artistic medium that can be used by artists to create works of art. Many artists have in the meantime exhibited artwork that utilizes waste ink. Lowe (2018) for example has published the artwork in Figure 1 by Amanda Russell that is referred to as *Ink waste art* and which captures brilliant colours of waste ink drawn from offset presses cascading in a silky stream into the barrel.

Figure 1. Ink waste art by Amanda Russell
Source: firespring.com

Another example of artwork from upcycled waste ink is shown in Figure 2. This artwork by two Australian is made using run-off ink of recycled inkjet cartridges. The artwork began the world's first 100% recycled artist ink in 2017 known as *Lousy Ink* ("Hear Me Out Exhibition and Lousy Ink", 2018).

Figure 2. Artwork made from Lousy Ink.
Source: zartart.com

Sara Abbott is another United States of America based artist who uses waste tank ink from printers and expired ink cartridges to create vibrant abstract compositions that interpret the virtue of

recycling and promoting a green environment. Her diverse art pieces are created using acrylics, oils, pastels, and ink on canvas (Figure 3).

Figure 3. Artwork made by Sara Abbott
Source: singulart.com

Despite the evidence of waste ink being utilized as an artistic medium in different parts of the world, there, however, is minimal research that has documented the experiments that have been undertaken with the waste inks by, for example, describing the colours that would be produced when the waste inks are applied to different surfaces using different tools and techniques and also what best preservation method there is for the medium. This paper reports a study that sought to fill this gap by documenting results of experiments with waste ink obtained from printing industries in Nairobi County, on effects on conventional and non-conventional surfaces, reaction to colour inks, painting and drawing techniques and modes of preservation. This was done to attest the waste ink's effectiveness as a painting medium.

Methodology

The reported study applied an exploratory research design because there was little or no information on the research problem due to the lack of preceding research studies (Mugenda & Mugenda, 2003). That study was studio-based and was carried out in an art studio. In the process of exploration, proper handling procedures were taken into consideration as waste ink is a pollutant.

Data Collection

The researcher applied an experimental data collection method. The tests in Figure 4 were carried out.

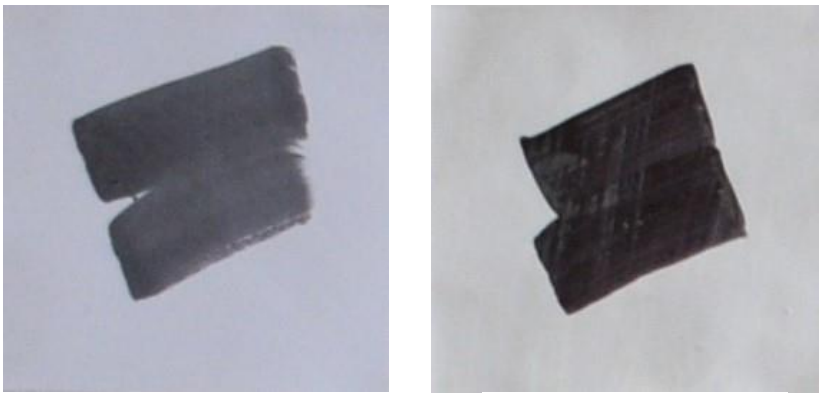
TESTS NO.	Independent variable	Intervening Variables
TEST 1	Waste ink	*-Conventional surfaces* Paper, canvas, plywood *-Non-conventional surfaces:* Aluminium foil, PVC banner, leather
TEST 2	Waste ink	*Selected Tools:* Brush, Palette knife, Sponge, Rag, Marker pen
TEST 3	Waste ink	*Painting and Drawing Techniques:* Dry brush, Wash, Layering, Splattering, Etching, Masking, Stippling, Hatching, Cross hatching, Scribbling
TEST 4	Waste ink	*Reaction to Colour Inks*- Cyan, magenta, yellow.
TEST 5	Waste ink	*Preservation methods:* Lacquer, Gloss varnish, Matt varnish, Fixative

Figure 4. Tests carried out on waste ink as a medium for painting

Data Analysis

a) Surfaces

On analysis, paper was found to holds waste ink more efficiently and provides well-defined brush stroke edges both when primed and unprimed. However, the primed paper provides a strong contrast with waste ink as compared to unprimed paper. The unprimed paper takes 5 to 20 seconds to dry which is relatively fast than primed paper which takes 55 to 60 seconds to dry. Figure 5 shows the appearance of waste ink on paper.

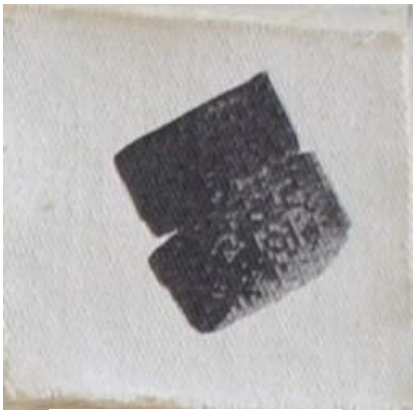


Unprimed paper **Primed Paper**

Figure 5. The appearance of waste ink on paper

Canvas also holds waste ink efficiently. Primed canvas has well-defined brush stroke edges although unprimed canvas smudges. Unprimed canvas takes 10 to 20 seconds to dry while primed canvas 40 to 55 seconds to dry. The images in Figure 6 show the appearance of waste ink on canvas.

Unprimed canvas



Primed canvas

Figure 6. The appearance of waste ink on canvas

Solid conventional surfaces such as plywood absorb waste ink efficiently. Nonetheless, unprimed plywood slightly smudges when waste ink is applied to it but when primed has well-defined edges. Unprimed plywood takes 10 to 20 seconds to dry while primed takes 50 to 55 seconds to dry. The below images in Figure 7 show the appearance of waste ink on plywood.

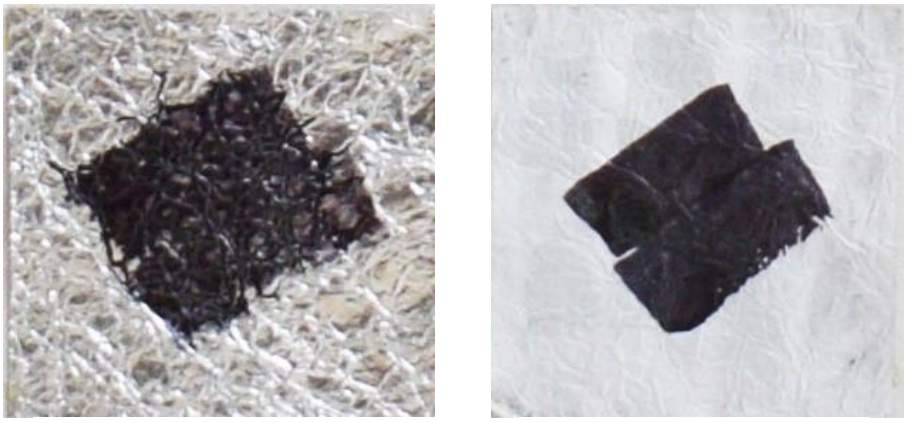
Unprimed plywood

Primed plywood

Figure 7. The appearance of waste ink on plywood

It was observed that aluminium foil smudged waste ink and took 4 hours to dry. However, when primed, the surfaces had well-defined

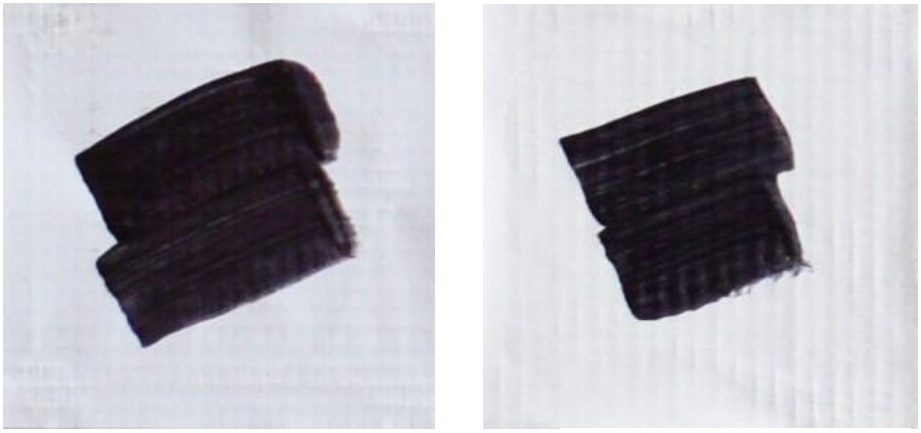
edges and took 1 to 3 minutes to dry. The images in Figure 8 show the appearance of waste ink on aluminium foil.



Unprimed aluminium **Primed aluminium**

Figure 8. The appearance of waste ink on aluminium foil

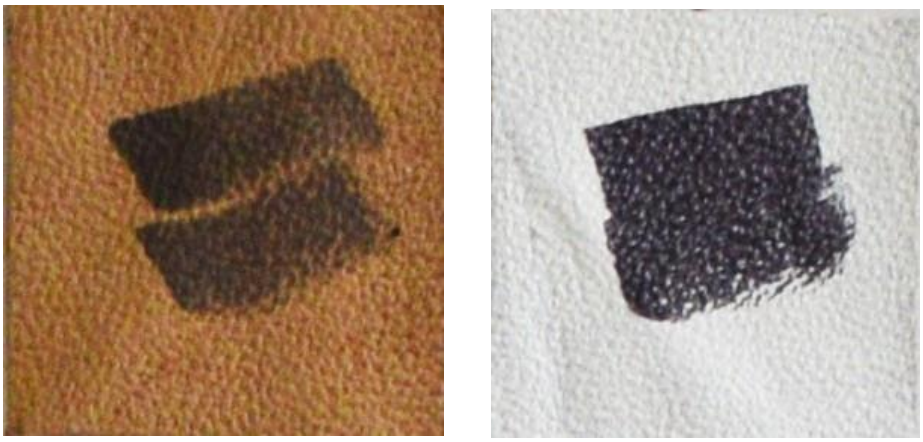
PCV banner that is used as a printing surface produced well-defined brush stroke edges both when primed and unprimed. The primed surface took more time to dry than the unprimed surface. The images in Figure 9 show the appearance of waste ink on the PVC banner.



Unprimed PVC banner **Primed PVC**

Figure 9. The appearance of waste ink on PVC banner

Leather also had well-defined brush stroke edges both taking less than 60 seconds to dry when primed and unprimed. The images in Figure 10 below show the appearance of waste ink on Leather.



Unprimed Leather **Primed Leather**

Figure 10. The appearance of waste ink on Leather

b) Tools

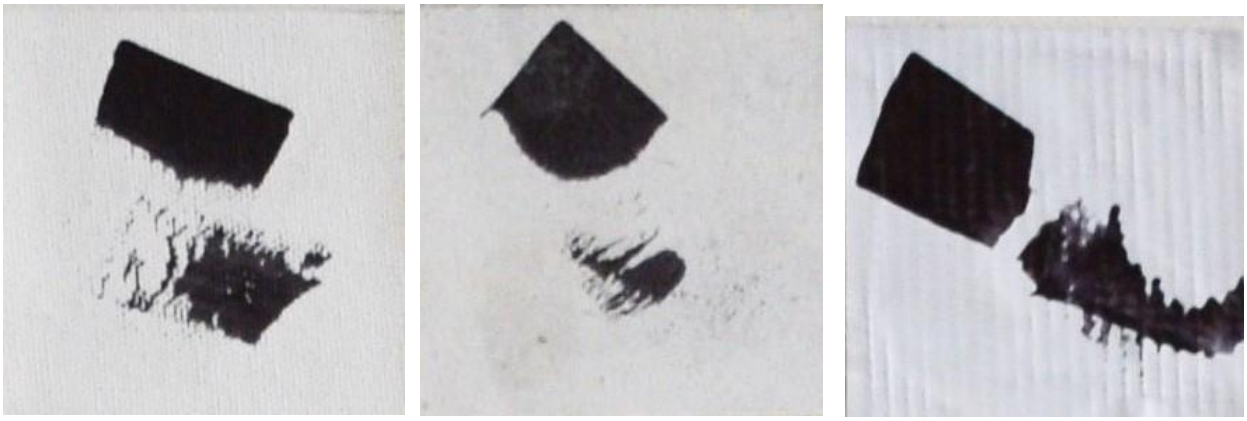
The researcher experimented with a variety of tools on three selected surfaces namely primed canvas, hardboard and PVC banner. The tools that were used were brushes, palette knives, sponge, marker pens and rags.

Both the brush tool and palette knife worked well with waste ink producing marks that can easily be manipulated in the creation of paintings. It was also observed that the edge of the palette knife had sharper outlines as compared to using the back part of the tool as shown in Figure 11.

Brush

Canvas **Hardboard** **PVC Banner**

Palette knife

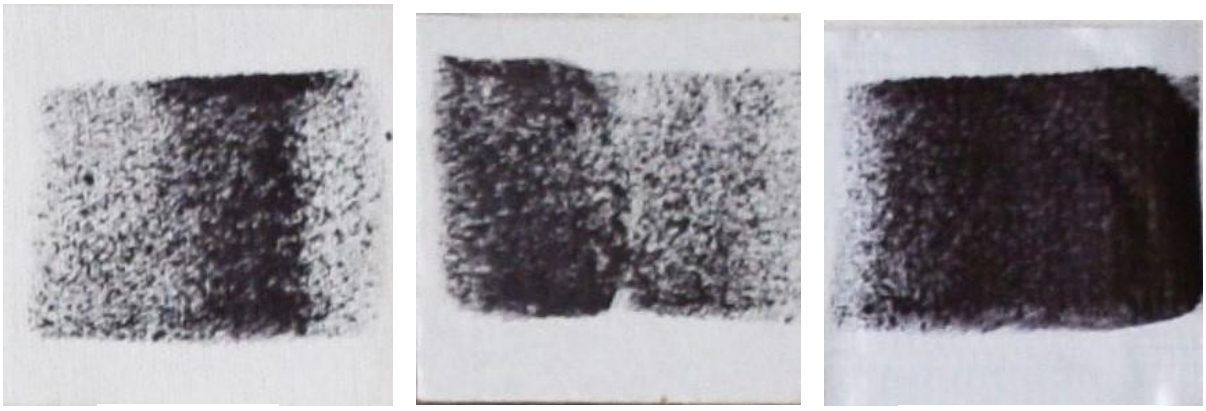


Canvas **Hardboard** **PVC Banner**

Figure 11. Waste ink appearance using brush and a palette knife as tools

Both the sponge and rag as painting tools absorbed waste ink efficiently and were able to create marks on the surfaces that could be used in a painting composition. The sponge had clear visible marks when used on canvas and hardboard, however, it smudged on the PVC banner because of the banners smooth surface as shown in Figure 12.

Sponge



Canvas **Hardboard** **PVC Banner**

Rag

Canvas **Hardboard** **PVC Banner**

Figure 12.The appearance of waste ink using sponge and rag as tools

The researcher then filled an empty marker pen with waste ink to observe if it could hold the medium and be used as a writing material. It was observed that the marker pen perfectly held waste ink and could be used as a writing medium providing great quality strokes and writings as shown in Figure 13.

Marker Pen

Canvas **Hardboard** **PVC Banner**

Figure 13. The appearance of waste ink using a marker pen

c) Painting and Drawing Techniques

The researcher then experimented using a variety of painting and drawing. The experiments were done on three different selected surfaces. The painting experiments were done using dry brush, wash, layering, splattering, etching and masking while the drawing techniques included stippling, hatching, cross-hatching and scribbling.

It was observed that most techniques were successful on the three selected surfaces and that only a few did not attain the result expected by the researcher. Dry brush, wash, layering, splattering, etching and masking painting techniques were applied on the three selected surfaces (canvas, hardboard and PVC banner). All the techniques appeared well defined and satisfactory to the researcher except the etching technique on the PVC banner. Here, the marks were hardly visible as compared to canvas and hardboard due to its smooth surface.

Experimenting on the possibility of achieving a wash effect, the researcher thinned waste ink using a standard thinner which easily

Dry brush **th the medium. Figure 14 shows the results of painting techniques on the selected surfaces.**

Canvas

Hardboard

PVC Banner

Wash

Canvas

Hardboard

PVC Banner

Layering

Canvas

Hardboard

PVC Banner

Splattering

Canvas **Hardboard** **PVC Banner**

Etching

Canvas **Hardboard** **PVC Banner**

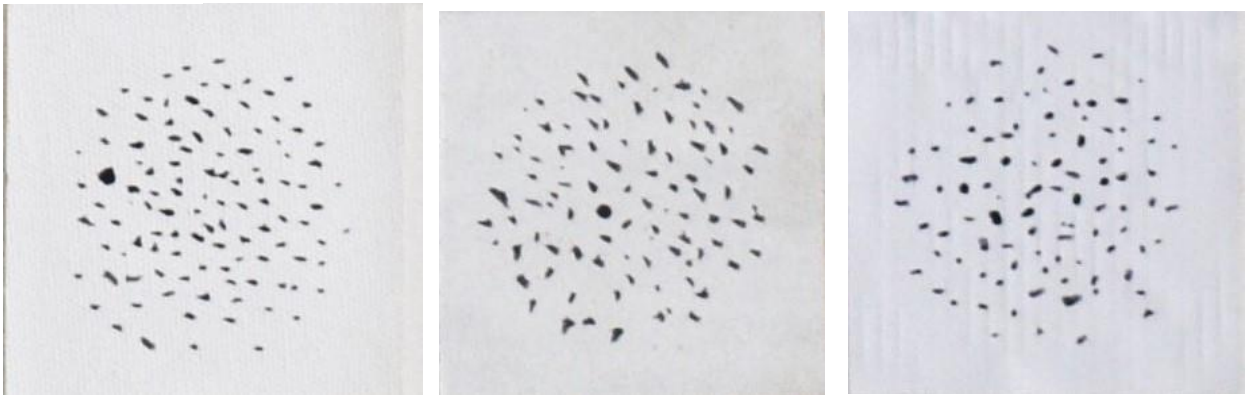
Masking

Canvas **Hardboard** **PVC Banner**

Figure 14. The appearance of waste ink using painting techniques

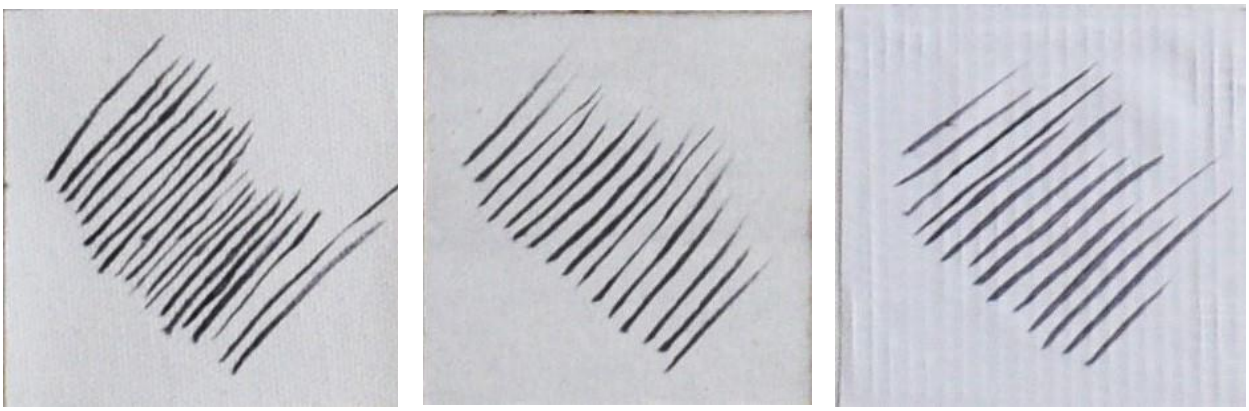
The researcher used a brush to experiment with stippling, hatching, cross-hatching and scribbling for the drawing techniques. The results all appeared well defined and easily noticeable. Figure 15 shows the results of drawing technique experiments on the three selected surfaces.

Stippling



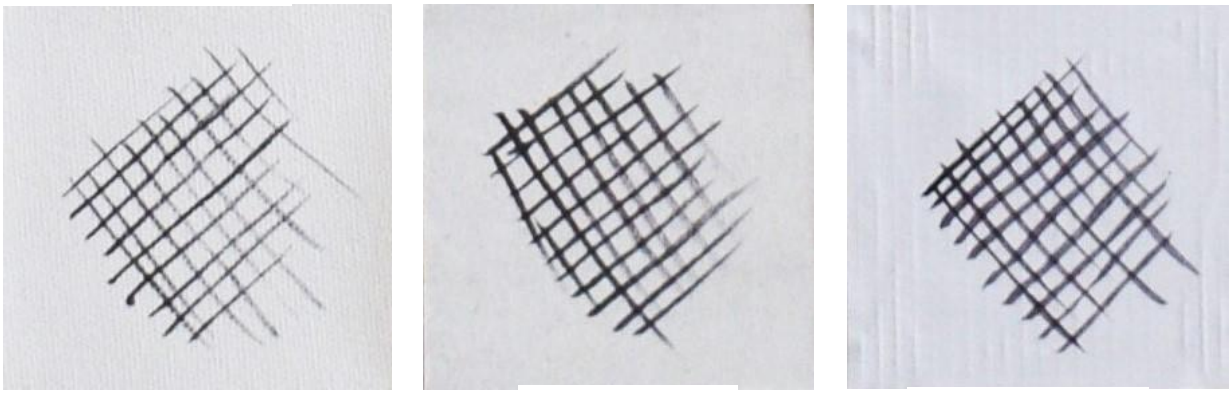
Canvas **Hardboard** **PVC Banner**

Hatching



Canvas **Hardboard** **PVC Banner**

Cross-hatching



Canvas **Hardboard** **PVC Banner**

Scribbling

Canvas **Hardboard** **PVC Banner**

Figure 15. The appearance of waste ink using drawing techniques

d) Coloured inks

The reaction of waste inks from printer cartridges on coloured inks was then documented. The surface that was used in this category was canvas primed with silk vinyl. It was observed that waste ink easily darkened the primary, secondary and tertiary colours. It was therefore used sparingly. Figure 16 shows the colour results of waste ink acquired from disposed of printing cartridge inks when mixed with primary, secondary and tertiary colours.

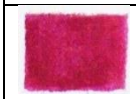
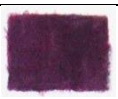
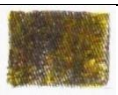
Waste Ink	Colour to be mixed with	Result
	 Blue	
	 Red	
	 Yellow	
	 Green	
	 Purple	
	 Orange	
	 Blue Green	
	 Blue Purple	
	 Red Orange	
	 Red Purple	
	Yellow Orange	
	 Yellow Green	

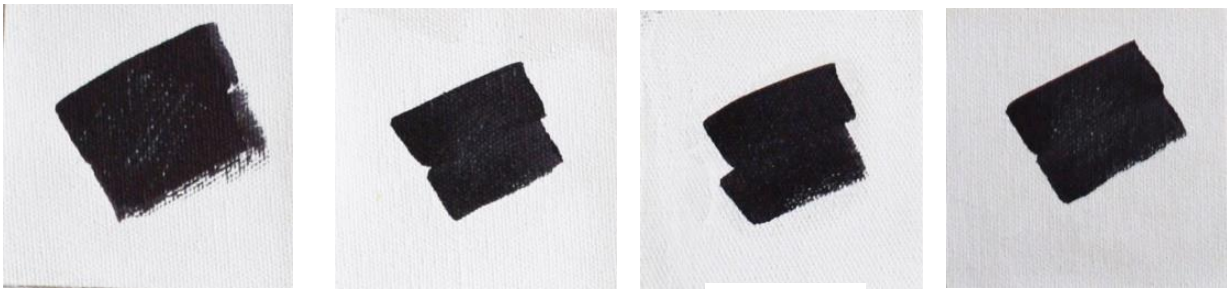
Figure 16. Waste ink mixed with primary, secondary and tertiary colours

e) Preservation method

Preservation of waste ink was not a challenge given that one of the components of waste ink is varnish which coats the medium when dry. The researcher then experimented with the use of an owl to govern the best preservative method when exposed to external scratches on the three selected surfaces (canvas, hardboard and PVC banner). The preservation methods used were fixative, matt varnish and lacquer.

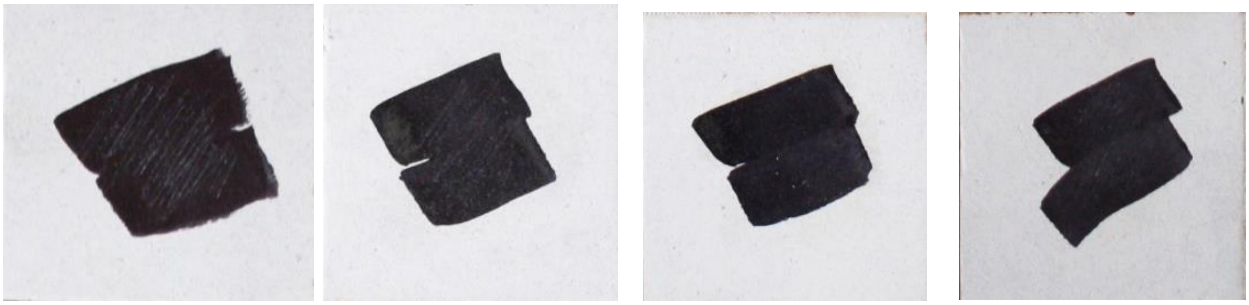
It was observed that all the preservative methods did not alter the colour of waste ink, however, some were more effective than others. The images in Figure 17 show the effectiveness of each preservation method.

Canvas



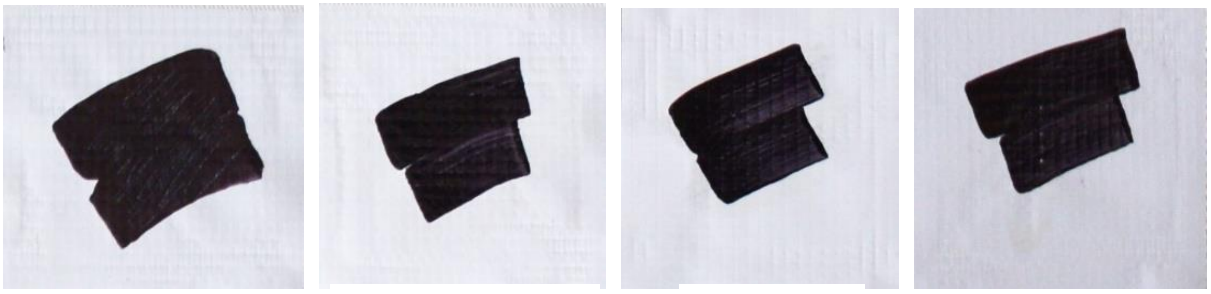
Unprotected **Matt Varnish** **Lacquer** **Fixative**

Hardboard



Unprotected **Matt Varnish** **Lacquer** **Fixative**

PVC Banner



Unprotected **Matt Varnish** **Lacquer** **Fixative**

Figure 17. The appearance of waste ink using drawing techniques

From the results shown in Figure 17, lacquer was observed to be the most effective preservative method when scratches were applied, followed by fixative and finally matt varnish.

Conclusion

In conclusion, waste ink is an effective painting medium based on how it reacted to the intervening variables. In relation to surfaces, waste ink easily absorbs into the surfaces and dries relatively quickly on primed surfaces making it efficient as a painting medium. The practical application of waste ink on surfaces using different tools and techniques was interesting as the medium is easily manipulated providing well-defined marks with great contrast to light surfaces. Waste ink also effortlessly mixes with colour inks making it efficient for artistic compositions that comprise colour matter. The medium can also be preserved easily when exposed to external factors such as scratches and water with different vanishes safeguarding the artwork created. Waste ink is without a doubt is an effective painting medium.

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